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REPORT

OF THE

DEPARTMENT OF MINES,

NOVA SCOTIA,

For the Year ended 30th September, 1905.

HALIFAX, N. S.
COMMISSIONER OF PUBLIC WORKS AND MINES,
KING'S PRINTER,
1906.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR ENDED SEPTEMBER 30th, 1905.

To His Honour The Honourable Alfred Gilpin Jones,
Member of the King's Privy Council for Canada.
Lieutenant-Governor of Nova Scotia, *&c. &c.*

May it Please Your Honour,—

I respectfully present herewith to Your Honour the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information complied by him from official and other returns.

I am,

Your Honour's obedient servant,

Wm. T. Pipes,
Commissioner of Public Works and Mines.

Halifax, December 22nd, 1905.

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REPORT

ON THE

MINES OF NOVA SCOTIA.

BY EDWIN GILPIN, JR., A.M., LLD., D.C.L.,

COMPANION IMPERIAL SERVICE ORDER, FELLOW OF THE ROYAL SOCIETY OF CANADA, ETC., ETC

OFFICE OF INSPECTOR OF MINES,
HALIFAX, December 22nd, 1905.

TO THE HONOURABLE WM. T. PIPES, M.L.C.,
Commissioner of Public Works and Mines:—

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia

The following summary shows, so far as I have been able to learn the Mineral production of Nova Scotia for the year ended September 30th. 1905, compared with that for the year ending September 30th, 1904:

		Year ended Sept. 30, 1904	Year ended Sept. 30, 1905.
Gold	oz.	14,279	15,550
Iron Ore**	Tons	258,338	73,600
Manganese Ore*	"	....	22
Coal Raised†	"	5,247,135	5,050,420
Coke Made†††	"	235,158	367,778
‡Gypsum†††	"	181,166	197,292
Limestone†	"	191,356	274,002
Barytes†††	"	1,100	4,500
Moulding Sand†	"	175	230

*Including 21,000 tons of ankerite.
†Ton of 2,240 lbs. flux.
†††Net tons.
‡Amount exported.
Iron Ore imported 274,002 net tons.

Statement showing Sources of Revenue and amounts received by Mines Department during year ended Sept. 30, 1905.

	1st Quarter.	2nd. Quarter.	3rd. Quarter.	4th. Quarter.	Total.
Diamond Drill	....	....	....	573 67	573 67
Prospecting License Applications	$ 1499 50	789 00	1368 50	1805 00	5462 00
Gold Lease Applications	516 00	610 00	904 00	736 00	2766 00
License to Search, Applications	1410 00	1650 00	5100 00	1890 00	10050 00
Lease Applications other than Gold or Silver	500 00	1350 00	600 00	1200 00	3650 00
Rentals, Gold	50	3 50	2147 00	8890 00	11041 00
Rentals, other than Gold or Silver	....	30 00	8100 00	13710 00	21840 00
Gold Royalty	2152 94	1180 16	1297 93	779 33	5410 36
Coal Royalty	150965 15	141823 81	79555 80	177295 22	549639 98
	$157044 09	$147436 47	$99073 23	$206879 22	610433 01
Fees					3378 25
					$613811 26

Statement of Bonus, Iron and Steel.

Less amount paid as bonus on each ton of coal consumed in the manufacture of Iron and Steel in Nova Scotia as follows:

October 14th, 1904,	Dominion Iron and Steel Co.,	6¼ cents	$ 7981 70	
January 5th, 1905,	Dominion Iron and Steel Co.,	6¼ "	8106 37	
January 23rd, 1905,	Nova Scotia Steel and Coal Co.,	5 "	1437 45	
February 8th, 1905,	Nova Scotia Steel and Coal Co.,	5 "	2437 00	
February 7th, 1905,	Nova Scotia Steel and Coal Co.,	5 "	3548 00	
April 29th, 1905,	Dominion Iron and Steel Co.,	6¼ "	7858 57	
May 31st, 1905,	Nova Scotia Steel and Coal Co.,	5 "	2243 20	
July 13th, 1905,	Dominion Iron and Steel Co.,	6¼ "	8120 22	
				$41732 51

During the past year the survey of leased coal areas in Cape Breton, County has been continued by Mr. R. W. McKenzie. The necessary surveys and base lines have been carried out wherever needed. A check survey was made to connect the south side of the Cumberland Coal Field, with the eastern extension of the base line from the Joggins to the Styles mine, laid down many years ago by Professor Oram. This was required to prevent over lapping and for the purpose of assuring the correctness of the office plan.

The Provincial Exhibition Commission having put up a suitable building on the Provincial Exhibition grounds for the purpose of displaying the minerals of the Province, your Government installed a very good exhibit of the minerals of Nova Scotia, and of their derivatives. As the building was placed at the disposal of the Department only a day or so before the opening of the Exhibition, the mineral exhibit was not as well up to the mark as it could have been made had more time been allowed. It is to be hoped that at the next Exhibition it will be more extensive.

It is intended to have this exhibit permanently maintained in the "Mines Building of the Provincial Exhibition," so that, at all times, parties interested can study a comprehensive and well prepared exhibit of the mineral resources of the province.

Mr. Piers, the curator of the Provincial Museum, contributed every attention and care to the installation of this pleasing exhibit. He has also continued to enlarge the Provincial Museum, and has started a card catalogue of the science library. This Library is steadily increasing in appreciation, and is visited by persons from all parts of the Province, for the purpose of study and borrowing books connected with their studies.

The schools for granting Certificates of Competency to Managers, Underground Managers and Overmen have been continued as usual, and the annual examinations successfully held.

The instruction and examination of Stationery Engineers has been held under the new act, which is, I understand, to be improved by some amendments. The Boards for granting certificates to Miners, Shot Firers, and Mine Examiners have been continued during the past year.

The departmental drills have been more or less in use during the past season. A suitable store house has been purchased at the Railway Station at Hantsport, and all drills not in use are returned there for cleaning, repairs, etc. A report by Mr. Weatherbe will give fuller particulars on this subject.

COAL TRADE.

The returns of coal sold during the year 1905, show, when compared with those of 1904, as follows :—

	1904	1905
Nova Scotia	1,395,593	1,651,735
New Brunswick	414,537	411,967
Newfoundland	127,138	138,120
Prince Edward Island	80,141	75,136
Quebec	1,730,948	1,492,399
West Indies	———	2,524
United States	713,170	652,538
Other Countries	83,082	50,863
Total	4,544,609	4,475,284

The extension of operations by the Nova Scotia Steel and Coal Co., doubtless accounts for the increase in the Nova Scotia sales.

CUMBERLAND COUNTY.

During the past year the production was 621,516 tons, compared with 631,604. tons in 1904. The principal producers were the Cumberland Railway and Coal Co., 477,254 tons, and the Canada Coal and Railway Co., 53,807 tons.

The explorations in the coal field lying to the west of Springhill were continued during the year. A deep drill hole north of Half Way Lake cut the extension of the seams of the Springhill district at a considerable depth. Attempts are now under way to prove this coal nearer the lake, where it is believed it can be reached at a more moderate depth. Further developments by the seams in the vicinity of Maccan is being arranged for by Toronto capitalists.

PICTOU COUNTY.

The production was 593,126 tons compared with 631,604 tons during the year 1904.

The principal event in the Coal Mining history of the county during the past year was the cutting of the main and deep seams by the Allen shafts of the Acadia Coal Company.

The following report by A. V. Cameron Esq , Deputy Inspector for the Counties of Pictou and Cumberland, will give details of the progress of the mines in his district :

SPRINGHILL, November 6th, 1905.

E. GILPIN, ESQ.

Deputy Commissioner and Inspector of Mines.

DEAR SIR,—I have the honour to submit to you herewith a condensed report on the various mines in the district of Pictou, Colchester and Cumberland Counties.

NO. 2 SLOPE, SPRINGHILL.

In submitting my report for 1905, I may say that in the above slope, pillar work has produced the largest portion of the output, especially from the East side of the Aberdeen slope, where about one mile of work is open.

There are chutes at intervals of 500 and 800 feet to the rise from the 2300 level feet.

From this level the Aberdeen sinking is extended 1200 feet, with East and West levels at the halfway and at the bottom.

The former East has been extended 1644 feet, on a total distance of 2600 feet, and the latter 497 feet, whilst the west level was extended 945 feet.

When the Aberdeen fault was encountered and crossed by 106 feet of stone drift, making a total distance at the present time of, 1164 feet, with coal 11 feet 4 inches thick, free from stone or clay and of the very best quality.

This level will cut No. 2 hoisting slope at 3,500 feet.

On the halfway level west a stone drift or tunnel was driven to the bench coal of number one seam, a distance of 163 feet.

This seam is separated from the fall coal by some 30 feet of stone. These two seams average 4 feet each in thickness, and have been extended east and west 500 feet, and connections have been made to the rise with the 2300 feet level.

No. 2 hoisting slope, which has been submerged since the fire at Number one slope, is now cleared and well timbered to a distance of 770 feet below the 2300 feet level.

No. 3 Slope.

In this slope pillar work has been carried on throughout the year except at the 3,800 feet lift.

In the west 2,300 feet level from aircourse to the face of district 3,900 feet of pillars have been extracted very successfully from a total of 9,528 feet.

On the west of 3,200 feet level 1,550 feet of pillars have been drawn from a total distance of 9,504 feet.

The west 3,800 foot level has been extended 1,255 feet, or a total distance of 2,991 feet. And the east and west under and overlying seams have levels in a distance 1,110 feet each.

The 3,200 feet and 2,600 feet east have produced a fair proportion of pillar coal.

All these levels are well timbered and in very good condition.

SURFACE.

At No. 2 slope a coal pocket 62 feet long, 15 feet wide, and 15 feet high has been erected for the purpose of holding 200 tons of coal for domestic use.

The building is situated about 300 feet from a rotary screen, from which the supply of nut coal is taken. Coal is conveyed from the screen to the pocket by a Jeffrey cable conveyer, having conveying discs 6 inches in diameter.

The full length of the conveying system will be 714 feet. A rotary screen, a single Jeffrey single chain elevator, having a capacity of 50 tons per hour, will be used to raise the coal from the bottom of the bin to a height sufficient to discharge into the conveyor or trough. The pocket will contain five chutes, and five carts can load at the same time.

I have made 16 visits to these mines during the year.

The average amount of air is about 78,000 cubic feet per minute.

JOGGINS MINES.

This Mine has worked fairly steadily during the year with the exception of the months of January and February.

The output of the mine at this present time is in the vicinity of 5000 tons per month.

The levels in this mine have not been advanced for about two years, but are being worked now by single shift. The balances on both levels and both sides are going double shift.

However, notwithstanding the great drawback from having advance work stopped for two years, the management expect to increase the output this year.

Considerable work has been done on the main slope by stripping down loose plys of roof, and making a good high slope.

The main air-crossings have been permanently built with heavy brick walls. All stoppings along the main slope have been rebuilt to prevent the leakage of air. The mine is in fairly good condition as regards ventilation.

The only visible drawback now to a fair output is the scarcity of working places.

Safety lamps only are used in the mine. The use of explosives is restricted to stone work only.

The mine is well ventilated and in good safe condition generally.

SURFACE.

Considerable repairs have been done to the colliery houses and buildings about the works. The wharf is at present undergoing repairs. A new shaker screen will soon be in operation, which will afford more efficient and economic means for preparing the coal for market. A new reservoir has been made on the main line of the water system, which shortens the pumping line about a mile, cutting off the extra distance to No. 3 slope.

There is on an average 31,000 cubic feet of air per minute circulating, which makes the ventilation fairly good throughout the mine.

I have made thirteen visits to this mine during the year.

Minudie Mine, River Hebert.

Work has been fairly steady at this colliery during the past year.

The underground workings have been advanced in all directions, with the exception of sinking.

The mine is perfectly clear of gas or any impurities. The ventilation is very good. There is an average of 28,000 cubic feet of air passing per minute.

This company is constantly making improvements on the surface, keeping in view the fact that they must send clean coal into the market. They have built a very nice office at their mine during the year, and have enlarged their water saving dam.

Everything in and around this colliery is in first rate condition.

Fundy Mines.

Very little development work has been done at this mine during the year.

The 300 feet levels and 500 feet levels have been driven a short distance.

These levels are now driven the following distances:—

The 300 feet east is in	475 feet.
" 300 " west "	400 "
" 500 " " "	435 "
" 500 " east "	838 "

This mine worked steadily until June 26th when a strike was declared, owing to difference between the men and the management.

The Firemen and Pumpmen were called out, and no settlement has been arrived at yet.

The water in the mine at this time is about 50 feet above the 500 feet levels.

SURFACE.

The Rhodes, Curry Co. of Amherst, were given the contract to build a large bankhead building which was partly constructed when the strike took place. The mine was well ventilated when it was working, and was in a fairly good condition to produce quite an output of very good quality of coal.

STRATHCONA MINE, RIVER HEBERT.

There was no development work in the old seam, with the exception of the extension of No. 1 level, which worked steadily during the year.

No. 3 and 4 levels were stopped about six weeks in the spring. This was caused by the pumps giving out and allowing the water to rise above these levels.

Since then the levels have been cleaned up, and No. 4 level put through a fault of 37 feet. The coal in this seam is of good quality. There has been a new pump and boiler placed at this mine, which will improve matters. The new slope has been sunk 300 feet deeper, making it about 500 feet deep.

Levels have been started at 200 feet and at 400 feet from the surface. The 200 feet levels are driven about 500 feet and places started up hill.

The coal in this seam is about 38 inches thick, and of good quality.

On the surface they have one 45 H. P. boiler and a donkey engine which does the work for the present.

The company have built 8 tenement houses,. During the year work has been carried on steadily in this slope. The ventilation is fairly good.

I have made 12 visits to this mine during the year.

JUBILEE MINES.

There has been very little work done in this mine during this year. The men struck for wages due them early last spring, and as far as I know there has been no settlement yet.

The mine has been kept pumped out all summer, and I am informed that work will be resumed shortly. This mine was in good condition when working, although not a large producer. The coal is of a very good quality, and in good demand.

SCOTIA MINE.

This mine has worked fairly steadily during the year.

There are only a few men working in this mine. They have erected a new engine house to replace the one that was burned September, 1904.

The output at this mine is small. They haul the coal to a siding on the Chignecto Railroad, and load cars there. This mine is fairly well ventilated, and in fairly good condition throughout.

There is an average of 5,000 cubic feet of air per minute in this mine.

CHIGNECTO MINE.

This mine has been worked steadily during the year. The levels have been driven to a distance of 1350 feet east and west. No. 2 and No. 3 balances are working, and No. 4 levels east and west are being broken off.

This mine continues remarkably dry through and very clear of dust. The ventilation is good. There is on an average 15,000 cubic feet of air per minute in circulation.

This company is opening up a new slope half a mile east of No. 1 main slope, which will be know as No. 3 slope.

They are now installing boilers and engines, for the purpose of hoisting the coal out of the slope, and also for drawing the empty mine cars back from the present bankhead, after they have been run down by gravitation, and run through the tipple and over the screens now in use.

This road will be a surface tramroad which is now nearing completion. This haulage will be a tail rope system, The new slope will naturally add to the output. The main object however is to connect with the present underground workings at a future date, to provide an aircourse for more extensive workings in the near future.

The coal found in the new sinking is about 7 feet thick, and of very good quality. I have made quite a number of visits to this mine during the year. At the present time it is in good condition throughout.

DEBERT MINE, COLCHESTER CO.

The development of this property has been vigorously carried on during the past year. There have been 14 men steadily employed. Unfortunately for the company, the slopes proved to be in a line of disturbances which have very materially retarded the work of getting coal on the market. But this delay has been compensated for by the results of prospecting work which they have been doing. On August 9th a diamond hand-drill was started on the west level for the purpose of testing the underlying strata. At a depth of 70 feet below the pavement a seam of 4 feet 6 inches of clean coal was gone through. At 100 feet another seam of 2 feet 6 inches, and at 140 feet yet another seam 3 feet 6 inches, proving the existence of four consecutive seams of coal on this property.

It has been found that the slopes sunk on the north dip are simply on the north side of an anticlinal fold, which runs across the property north west and south east, and that the true dip of the measure is to the south. There is no doubt that the coal seams are duplicated south of the anticline where the measures are more regular. If this proves to be the case it will be a very valuable acquisition to this coal district.

Acting on this assumption the Company has taken up additional territory to the south, and has a government steam drill at work.

This drill has gone through a thick layer of red sandstone and thin grey sand stone and slate, and at the last report prospects for coal were favourable. The drill is down 460 feet on a slant at right angles to the dip of the measures.

The stone sinking was abandoned early in the year, and the coal opened up and followed in the slope which is now down 550 feet. At a depth of 460 feet levels were driven east and west.

A bankhead was driven up from the east level 102 feet, connecting with the air slope for ventilation. Another level is being driven 25 feet above these, and is in 210 feet. Everything is in good shape in and around this colliery.

ACADIA MINE, WESTVILLE, PICTOU CO.

This mine worked continously during the past year.

Since my last report on this mine considerable improvements have been made. A new lift, No. 11, has been connected with the slope, where nearly all the output is taken from. The No. 10 lift is practically all worked out. Since my last report there has been about 3000 feet of level pillars drawn out very successfully; in fact there was hardly any coal left or lost in the entire distance.

No. 11 levels have been extended about 800 feet towards the boundary, and another jig is driven up and another is about to start This will make 10 jigs in this lift, nearly all opened up. There is also a level being driven north and south in No. 12. lift below the fault. These levels have been driven a distance of about 800 feet, and are in a good quality of coal. A level has also been started on the north side of No. 11 lift above the fault, which will open up a large area of good coal.

The present output is about 400 tons a day, in my estimation a fairly good showing for a one sided mine, as is now the case owing to a large fault on the north side of No. 11 lift. When the level going north is opened up and No. 12 lift fairly under way, the Acadia will be heard from as a large coal producer.

The airways in the mines have received due consideration during the year. Also the travelling way (or slope) which has been enlarged from No. 11 lift up as far as No. 7, and the enlargement will be continued as far as No. 6 lift.

SURFACE.

A large new Capel fan is being installed in position and will be in operation about the first of December. This fan is 13 feet 6 inches by 4 feet, is capable of produucing 150,000 C. F. of air per minute.

I have made 12 visits to this colliery during the year.

The average amount of ventilation is about 30,000 cubic feet per minute.

Albion Mine, Third Seam.

This mine has worked steadily during the year, and the following improvements have been made.

The new travelling road having been completed from No. 5 lift to No. 2, has added greatly to the efficiency of the ventilation and travelling. It has been under construction for over two years, at a very great cost, but the improvements made fully justify the cost. Sinking has been stopped at present at 1675 feet below present sinking level where coal is now being got. The levels east and west have been continued on double shift during the year. The east level in the sinking has been driven 1800 feet, and there is about 500 feet more to drive, to the limit of those levels, which will complete a section on this side of the mine.

There is not a balance started yet. This puts this part of mine in shape to work out from limit retreating. And this level will be finished and ready to start as soon as the section on upper lift is cleaned out.

West levels in sinking have not progressed as fast as the east levels on account of local troubles. These levels have been driven in about 1600 feet, and from present indications it looks as if the troubled ground has been passed through.

It is the aim of the management to push to the limit with these levels before any balances are worked, as the future success of the Albion Mines will depend greatly on the change of system the management is endeavouring to adopt. It is hoped that they may meet with the greatest success for the benefit of all concerned. A second pair of levels have been started in the sinking on the east side, and are now driven about 350 feet. This will place this side of the mine in a position when completed to work two lifts retreating in place of only working from the level, which will greatly add to the output and successful working of the overlying seams.

The present output is being taken from No. 5 lift which is being worked back from the boundary. But as balances and bords where driven as levels were advancing it makes the pillar drawing very unsuccessful and expensive. It is this experience that has caused the present management to aim at a more economical system of mining. Drainage and ventilation to this mine are good and well taken care of.

McGregor Seam.

There has not been very much work in this seam during the year, as it is used principally as a pumping station. Here the large Jeansville pump is installed. By this pump all the water is handled that is made in the Acadia areas at Stellarton. It is placed in such a convenient place that it will also handle all the water that will be met in the new Allan shafts when in operation.

One balance on No. 5 level east is all that is working in this mine at the present time, and it employs about 25 men, there being 9 bords working in the balance, which has an output of about 75 tons a day. No. 4 west is being cleaned up and repaired to drive to the boundary and prove the quality of the coal in this direction.

OUTSIDE IMPROVEMENTS.

One 316 H. P. Sterling Boiler has been added to the plant during the year. The smoke stack on this boiler is 48 inches in diameter, and 83 feet 4 inches high from the top of the boiler, and from the ground level 101 feet 5 inches.

I have made 13 visits to this mine during the year.

The average amount of ventilation passing through this mine is 70,000 cubic feet per minute.

Marsh Mine.

This mine has worked steadily during the year. Development work has been steadily advanced. No. 3 levels were driven a further distance of 373 feet with two more balances under operation. No. 4 levels were driven a further distance of 916 feet with 3 extra ballances working.

On the surface the only improvements made were the installation of another boiler, and the painting of all the mine buildings, which adds greatly to their appearance.

There is an average of 16,000 cubic feet of air per minute passing through this mine which makes good ventilation all the time.

Vale Colliery.

During the year operations at the Vale mine have been confined entirely to development of the west side of the mine. No. 4. level west has been driven 2100 feet from the main landing, and has the sixth balance turned off. No. 1 slant off No. 4 level is driven on the dip 1400 feet. No. 2 slant is driven 2500 feet. No. 5 level is driven 1900 feet from main landing and has four sections ready for development.

The ventilation in this mine has been improved by opening up airways and bychanging the system of splits. No additions have been made to the power of the plant and the output remains about the same.

The average amount of ventilation is 37,000 cubic feet per minute.

Allan Shafts, Stellarton.

Sinking on both shafts has been continued during the year.

In No. 2 shaft coal was struck at a depth of 900 feet.

Passing through this the second seam was tapped at a depth of 990 feet. This shaft was then sunk to a depth of 1016 feet and stopped. A drift is now being driven through to No. 1 shaft.

In No. 1 shaft coal was struck at a depth of 1202 feet and this shaft is still sinking to the second seam at the present writing.

No permanent construction work will be undertaken before next spring.

CONCLUSION.

In concluding my report for the year I may say that there has been considerable prospecting going on in the different counties during the year, but I heard of no valuable results.

The Eastern Coal Co., with headquarters at Toronto, is the latest addition to Cumberland's mining companies. This company some time ago purchased the property of Mr. J. T. Smith, at Maccan, and has also secured a large block of property to the south of the Smith mine, making quite an area that the company will control.

Mr. Robt. Archibald, C. E., has been appointed manager. He is an experienced man in this line of work, and should make a capable and efficient manager.

The company have men at work prospecting and locating suitable places for slopes. It is intended to fit the mine with the most modern equipment, capable of raising a large amount of coal daily. This company has excellent facilties for shipping, the mine being situated within a very short distance of Maccan Station on the I. C. R.

I have the honor to be, your obedient servant,

A. V. CAMERON,
Deputy Inspector of Mines.

Accidents during the year ended September 30th, 1905.

No.	Date.	Mine.	Name.	Occupation	Remarks.
1	Dec. 17, '04.	No. 3 Slope S. Hill	Samuel Reid......	Miner..........	Fell down a chute and badly injured.
2	" 5, "	Drummond... ...	Andrew Ross....	C. runner......	Leg broken, caught by box on landing.
3	Nov. 1, "	Albion Mine......	John Dunbar....	Driver..........	Killed by full rake of boxes.
4	Mar. 13, '05.	Marsh Mine......	J. W. Fraser......	Loader.........	Killed by fall of rock in his working place.
5	Nov. 25, '04.	Allan Shaft......	McLeod....	Loader.........	Killed by fall of stone from side of shaft.
6	Apr. 25, '05.	No 2 S. Hill.....	G. Lindergavist.	T. carrier......	Leg broken above the ankle.
7	" 22, "	Albion Mine.....	Archie Jamieson	Cage runner..	Caught by cage and crushed.
8	" 8, "	No. 2 S. Hill......	Sam Wilson......	Cage runner..	Caught by box and belt wheel turnout.
9	" 19, "	Drummond M...	A. Campbell.....	Laborer,...	Jammed between screening plant and car, ribs broken.
10	" 3, "	S. Hill.............	Joseph Hannah.	" at screens.	Killed instantly by being run over by hopper.
11	May 19, "	Marsh Mine......	F. Wilkes.........	Powder tender	Killed instantly by explosion of powder.
12	July 19, "	No. 3 S. Hill.....	D. Evans.........	Miner..........	Leg broken below the knee.
13	Jan. 16, "	No. 2 S. Hill.....	John Scott.... ...	Pusher on.. ...	Killed by trip on turnout.
14	Aug. 23, "	No. 3 S. Hill.....	C. Hart...........	Trapper boy...	Leg broken by coming in contact with haulage.
15	Aug. 23, "	No. 3 S. Hill.....	R. M. Smith......	Shover down..	Leg broken by empty rake catching him on leg.
16	June 30, "	Minudie Mine...	J. Noeles.........	Miner..........	Leg broken by roof stone.
17	Aug. 4, "	Drummond M...	F. Reid...........	Driver.........	Back hurt by being caught between boom and box.
18	Aug. 29, "	No. 3 S. Hill.....	A. McKinnon....	Miner..........	Buried by coal and killed.
19	Sept. 11, "	No. 2 S. Hill.....	Wm. Cherrie.....	Miner..........	Killed by haulage trip on No. 1 incline.
20	Sept. 19, "	No. 3 S. Hill.....	G. Bishop.........	Miner..........	Leg broken below the knee by a piece of coal.
21	Sept. "	No. 3 S. Hill.....	Wm. Hall.........	Miner..........	Leg broken by box.
22	Sept. "	No. 3...	P. Shields.........	Miner..........	Arm broken.

CAPE BRETON, INVERNESS AND VICTORIA COUNTIES.

The production of coal in the County of Cape Breton amounted to 3,624,509 tons, compared with 4,545,609 tons during the year 1904.

The production of the Dominion Coal Co., was 3,076,107 tons, that of the Nova Scotia Steel & Coal Co. was 504,126 tons

The reports of Neil A. Nicholson, Esq., and of John Cadegan, Esq., Deputy Inspectors, will show the progress of mining operations in these districts.

Old Bridgeport, C. B., Dec. 12th, 1905.

Dr. E. Gilpin,
Deputy Commissioner and Inspector of Mines, Halifax, N. S.

Sir,—I have the honor to submit my annual report on the Northern division of the Island of Cape Breton.

The condition of the mines in this district is very satisfactory, but the coal shipments from Inverness County have been a great disappointment. Owing to financial difficulties, the output from the Port Hood Colliery this year is only 26,155 tons, against 81,675 tons last year, a decrease of 55,520 tons. The output of the Inverness Railway and Coal Company, shows a decrease of 19,977 tons, but it is gratifying to know that the Nova Scotia Steel and Coal Company has increased their output, 9,415 tons over the previous year. They have also produced 76,132 tons of coke and 55,750 tons of iron, during the year. The company is making preparations for the opening of a new colliery, to be known as Sydney No. 4, which will be operated by electricity. Not only will the most improved methods of haulage be adopted, but also a new system of developing this large area, lying to the North of Sydney No. 3.

As there is enough coal inland in this section of the country to last for a great number of years, and lying at a favorable angle, it is the intention of the company to lay a railroad to connect with Sydney No. 3, and drive drifts into the seam, with a grade of five per cent. Electric motors will enter the mine through these drifts, and convey the coal from the mine to Sydney No. 3, where it will be screened and prepared for the market.

There were twenty-eight accidents in this district during the year, five of these being fatal. There were nineteen men burned by an explosion of powder at Broad Cove, four of whom were seriously burned. This explosion was caused by a defective powder can, and also by the carelessness of the man who owned it. I therefore instructed the management to have every can examined, and see that they were secure and securely corked before passing into the hands of the men.

Yours respectfully,

NEIL A. NICHOLSON,
Deputy Inspector of Mines.

Port Hood Coal Mining Co.

Last year the output of this colliery was less than one-third of the previous year, owing to financial difficulties, and the property went into the hands of a receiver. The Eastern Trust Company is for the time administering the affairs of the company.

The mine is in good condition, and there should not be any trouble in having an output of 600 tons per day. On No. 2 level north, there is a double balance with 22 bords and a single balance with 9 bords. On No. 2 level south, there is one double balance with 14 bords, and a balance in course of being driven. No. 3 level north, was driven in a distance of 400 feet during the year, and has a double balance with 19 bords. There were 2000 feet of the main slope retimbered, and the travelling road repaired.

The average amount of air is 40,000 cubic feet per minute.

This colliery was visited eleven times during the year.

Mabou Coal Mining Company, Limited.

This company suspended operations the last of July. The mine is still idle, but the pumps are kept going, and the mine kept clear of water.

During the year a trestle, 720 feet in length, was built from the bank-head, to connect with a new slope that was sunk 300 feet to connect with the old slope, so as to have a straight line of haulage.

The slope was sunk 450 feet during the year, and levels turned off, north and south, a distance of 150 feet from the main slope. There was a drift driven into the 8 feet seam, which is the underlying seam, 1400 feet down the slope. There is only 4 feet between the two seams, composed of coal and shale. At the surface there is 14 feet of strata between the two seams. This goes to prove that these two seams are coming together.

The average amount of air circulating through this mine is 8000 cubic feet per minute.

This colliery was visited ten times during the year.

INVERNESS RAILWAY AND COAL COMPANY.

Owing to the severity of the winter and the difficulty the company had in keeping the road open, the output this year is 19,977 tons less than during the previous year. Development work has been vigorously pushed ahead. The slopes were sunk 590 feet during the year and levels extended east and west. Their respective distances are as follows:

No. 4 level west was driven during the year, 1268 feet.
“ 5 “ “ “ “ “ “ 1050 “
“ 6 “ “ “ “ “ “ 185 “
“ 3 “ east “ “ “ “ 1052 “
“ 4 “ “ “ “ “ “ 1350 “
“ 5 “ “ “ “ “ “ 970 “
“ 6 “ “ “ “ “ “ 251 “

The deep is down 3000 feet from the surface. The thickness of the strata at the face is 690 feet. A new lodgement has been driven below No. 5 level, east, with a capacity of 300,000 gallons. There are fifteen back balances operating, with 95 bords on them.

The slope was relaid with rails 30 lbs. to the yard, with 1700 feet of a double track and 2000 feet of a single track, both tracks being laid on sills. Two new landings were laid and three old landings relaid.

This mine is in a good condition to have a daily output of 1200 tons on single shift.

Improvements on the surface were as follows: One new 300 h. p. Hienel water tube boiler, a new tipple shaking screen and picking belt, 45 feet in length, and a new knocking screen for making pea coal, were erected. An extension was built on the bank-head, 140 ft. in length by 20 ft. in height, and 22 ft. in width. Also a new powder house made of wood.

Average amount of air in circulation is 85,000 cubic feet per minute. This mine was visited eleven times.

NEW CAMPBELTON, VICTORIA COUNTY.

Work was suspended at this colliery during the winter, and resumed again as usual during the summer months when navigation opened.

The slope was sunk 250 feet during the year and the south level extended 50 feet, making a total of 250 feet from the main slope.

There are five bords in operation on this level. On the north side the levels are driven in 200 feet from the main slope, and the coal is improving as they extend to the north. There are fifteen working places in the mine.

The average amount of air passing through this colliery is 20,000 cubic feet per minute.

This colliery was visited five times during the year.

SYDNEY COAL COMPANY.

During the year the output at this colliery was 4296 tons, a decrease of 5053 tons from the previous year.

There are fifteen working places in the mine. The mine is in good condition. The ventilation, which is natural, is fair. The average amount of air passing through the colliery is 4000 cubic feet per minute.

This colliery was visited twelve times during the year.

NOVA SCOTIA STEEL AND COAL COMPANY.

SYDNEY NO 1.

There are 840 men employed in this colliery, 680 in the mine and 160 on the surface.

The output during the year was 262,966 tons, of which 101,136 tons were mined in pillars. These pillars are drawn very successfully. There is a new travelling road in course of being driven, parallel with the endless haulage, and which will probably be completed in about two months time. The main deeps on the south side were advanced 396 feet during the year.

The mine is in good condition and ventilation fair. The amount of air in circulation is 98,000 cubic feet per minute.

This mine was visited twelve times during the year.

The steel bank-head, which was in course of construction last year, is now completed.

SYDNEY NO. 2.

This mine was indefinitely closed in October, 1904. The output during that month was 2125 tons.

SYDNEY No. 3.

There are 910 men employed in this colliery, 800 in the mine and 110 on the surface. The output of this mine has kept increasing, until it has reached 1600 tons per day. The colliery is in its infancy and in the near future will give a good account of itself.

All the coal in this mine is handled entirely by small donkey engines, driven by compressed air. There are 19 of these small engines in the mine. On No. 3 level north and No. 5 and 6 levels south, endless haulage is used to convey the coal to the main slope. With this method, they can take 20 boxes attached to each grab in and out of the level. This system of haulage has a great advantage over the old system by horses, as it does away with a great number of boys, and makes it easier to keep the mine roads in good condition.

Development work has been pushed very rapidly during the year. The main slope is down 4500 feet from the surface, entering the submarine areas 3700 feet from the mouth of the slope, with 300 feet of cover. The levels have been advanced the following distances during the year:

No.	3	level	north	1600	feet.
“	4	“	“	850	“
“	5	“	“	780	“
“	6	“	“	1000	“
“	7	“	“	500	“
“	8	“	“	100	“
“	5	“	south	870	“
“	6	“	“	900	“
“	7	“	“	600	“
“	8	“	“	150	“

The lower levels in the main slope are driven entirely in the submarine areas, consequently No. 8 levels, north and south, had to be driven through barriers, as required in the Mines Regulation Act, before the regular mining of the coal could be commenced.

During the year, there have been three deeps driven north parallel with the shore line, for the purpose of extending the haulage into the coal lying south of Keaton's pond, while the main haulage will continue drawing coal from the submarine areas. Owing to the rapid development and increased output required, the company installed an additional compressor of the Walker type, capacity 3500, to supply the necessary power required to enable them to raise the output necessary for the next year.

This mine is in good condition. Average amount of air in circulation is 48,000 cubic feet per minute.

This mine was visited twelve times during the year.

IMPROVEMENTS ON THE SURFACE AT SYDNEY NO. 1.

The new cappel fan, 20 ft. in diameter by 8ft. wide, situated at the Queen Pit, and used for ventilating No. 1 colliery, is driven by a Canadian General Electric Type, C. L. V., 220 volt direct current, 120 horse power Motor running at a speed of 420 revolutions per minute. The motor drives the fan by means of a raw hide pinion, driving a cast iron cut spur gear, the pinion being 11 inches diameter, 2 inches pitch, 12½ inches face; and the spur gear 52 inches diameter, 2 inches pitch, 12 inches face. This motor, etc., was installed in June last, and has since given excellent satisfaction.

The steel head frame at No. 1 colliery was built by this company at Trenton. It consists of four braced columns and a pair of back braces, all supported on concrete piers. The height of the head frame is about 90 ft. above the tracks. It was erected over the old wooden head frame, and when built, the pullies from the old head frame were changed to the new one. The head frame was erected in the fall of 1904, and the change of pullies made on the 25th day of December last.

DOMINION NO. 1 COLLIERY.

This colliery was single shifted and worked 300 days during the year, employing 528 men and 63 boys in the mine and 91 men and 10 boys on the surface. The output during the year was 541,303 tons. Of this, 95,102 tons were mined in pillars.

Development work has been extended as follows:

Angle	deep,	2000 ft.,	total	distance	from	pit	bottom	5600 ft.
North	"	576 ft.,	"	"	"	"	"	6400 ft.
South	"	832 ft.,	"	"	"	"	"	6800 ft.

No.	8	level,	north,	112 ft.
"	9	"	"	1309 ft.
"	10	"	"	856 ft.
"	7	"	south,	198 ft.
"	8	"	"	205 ft.
"	9	"	"	735 ft.
"	10	"	"	44 ft.

The angle deep is 1000 feet past the shore line into the submarine area. The strata overlying the coal at face of deeps is 320 feet thick. There was a barrier of 100 feet left along the trend of the shore, to protect the land areas. No. 8 levels were driven through this barrier, 6 ft. by 9 ft., and are 500 feet under the sea, with a cover of 250 feet. There were a pair of headways driven off this level, 500 feet up the hill, with 8 bords. The cover at face of headways is 185 feet. These headways will not be driven any further.

There are 134 working places in the mine, exclusive of pillars.

The mine is in good condition. The average amount of air in circulation is 140,000 cubic feet per minute. This quantity is divided into two splits, with 75,000 cubic feet per minute on the north side and 65,000 cubic feet per minute on the south side.

This colliery was visited 14 times during the year.

SURFACE IMPROVEMENTS.

One shaker screen, two picking tables, each 30 feet in length, one lamp house, size 15 ft. x 30 ft. x 8 ft., were erected.

THE BRETON COAL COMPANY.

CARIBOU COVE.

This company has been operating at Caribou Cove since May last. They pumped out an old shaft that was sunk over thirty years ago. This shaft is 145 feet deep, and is divided into three departments, one for coal, one for pumping and the third for the men to ascend and descend. There are two pumps placed at the bottom of the shaft, one pumping into the lodgment, and the other pumping to the surface.

This seam is pitching at an angle of 85 degrees, and is four feet thick. They have driven six tunnels in from the shaft. These tunnels are over-lying one another, vertically, with six feet of flooring between them. They pierce through from one to the other for the purpose of ventilation. Their respective distances are as follows:—

No.	1	drift	156	feet.
"	2	"	187	"
"	3	"	271	"
"	4	"	103	"
"	5	"	136	"
"	6	"	260	"

The company does not intend to drive these drifts much further down, as they are going to sink the shaft 400 feet further, and drive into the eight feet seam, with the object of tapping this seam, lying at an angle that will enable them to work it to advantage. It is the intention of the company to pump out what is known as the Richmond Mine. There is a shaft sunk on this seam of coal to a depth of 200 feet. Mr. Pearl expects to erect a plant and proceed with the of development of this seam.

Appended you will find a list of accidents.

Yours respectfully,

NEIL A. NICHOLSON,
Deputy Inspector.

Accidents in Cape Breton Coal Mines, Southern District, Year ended Sept. 30th, 1905.

No.	Date.	Mine.	Name.	Age.	Occupation.	Remarks.
	1904					
1	Oct. 11.	Dominion No. 1.	Allan McNeil	23	Driver	Struck by box, ankle bone broken.
2	" 13.	" "	Frank Beattus	32	Miner	Leg broken by fall of roof coal
3	" 13.	N. S. S. & C. Co.	Simon Jesso	19	Loader	Killed by fall of stone.
4	" 18.	" " " "	Bernard McMullen	14	Door keeper	Killed by trip.
5	" 30.	Dominion No. 1.	Edward Hughes	28	Miner	Slightly injured by fall of coal.
6	Dec. 14.	N. S. S. & C. Co	Charles Gordon	22	Driver	Arm broken by boom falling on it.
7	" 16.	" " " "	James Rooney	43	Loader	Arm cut off by a fall of roof coal.
8	" 22.	" " " "	Hector McMullon	45	Shift-man	Arm broken by a fall of stone.
	1905					
9	Jan. 12.	" " " "	Edward Hanley	16	Landing Tender	Struck by an empty box, ankle bone broken.
10	Feb. 8.	Dominion No. 1.	Malcolm R. McDonald	32	Miner	Slightly injured by a fall of stone.
11	" 23.	Port Hood	William Walsh		Miner	Killed by boom sliding down slope while timbering.
12	Mar. 20.	Dominion No. 1	Ruben Crowley	23	Driver	Fell under box, knee and ankle injured.
13	April 8.	" "	John C. McNeil	24	Miner	Fall of coal, face and body injured.
14	May 3.	" "	Guss McDonald	15	Driver	Hand injured by being caught between spur and pinnion wheel of donkey.
15	" 29.	" "	Angus Gillis	38	Miner	Leg broken by a fall of coal from face.
16	" 23.	N. S. S. & C. Co.	Howard Way	14	Trapper Boy	Arm broken between tubs.
17	June 1.	" " " "	Allen McDonald	60	Miner	Slightly injured by fall of stone.
18	July 14.	Dominion No. 1	George Picco.	20	Helper	Leg broken by a fall of coal from face.
19	July 27.	N.S.S. & C. Co'y.	John W. McKay	29	Miner	Killed while riding on trip.

20	Aug. 1.	N. S. S. & C. Co'y.	James Ericson	23	Miner	Hip dislocated by a fall of stone.
21	“ 1.	“ “ “	John Stephenson	36	Loader	Leg broken by fall of stone.
22	“ 7.	Dominion No. 1.	John Graham	58	Shift Man	“ “ “ “
23	“ 21.	“ “ 1.	John Holiva	42	Miner	“ “ “ “
24	Sept. 7.	N. S. S. & C. Co'y.	Patrick Hannigan	36	Helper	Slightly injured by fall of stone.
25	“ 7.	“ “ “	Eli Saters	18	Loader	Slightly injured by shot blowing through from other room.
26	“ 15.	N. Campbellton.	William Carey		Miner	Killed on main slope by the trip.
27	“ 27.	Broad Cove	Moses Bernard		Loader	Caught by riding rake, slightly injured

Names of Men burned with powder on the morning of June the 8th, at the Pick House in No. 1 Mine, Inverness.

Name.	Age.	Remarks.
Dan G. McDonald	50	Seriously.
John Lewis	31	"
Pat. Cahill	43	"
John McKinnon	36	"
Angus McKenzie	60	"
James Gray	31	Slightly.
James Davidson	44	"
Simon P. Gillis	30	"
Rod McEachern	32	"
Dan. Fraser	31	"
Alex. McLauchlin	29	"
Lauchlin Mahar	24	"
Hugh McDonnell	56	"
Francis McIntyre	29	"
Alex. McDougall	25	"
Alex. McDonald	26	"
Stewart McQuarrie	22	"

BRIDGEPORT, Nov. 21st, 1905.

E. GILPIN, JR., ESQ.,
Deputy Commissioner and Inspector of Mines.

SIR :—I beg to submit to you a report on the Southern Coal Mines of Cape Breton County for the year ended September 30th, 1905.

I am, your obedient servant,

JOHN CADEGAN,
Deputy Inspector of Mines.

CAPE BRETON COAL, IRON & RAILWAY COMPANY.

Development work at this colliery was somewhat retarded during the season owing to the lack of railway accomodation and shipping facilities to enable the company to place their product on the market. It has not been considered expedient to bank a large quantity of coal until means were provided for disposing of it.

No. 1 slope was advanced 390 feet and No. 2 slope 635 feet during the year. No. 1 west level in No. 1 slope was extended 310 feet, and No. 2 west level 880 feet. Both slopes were permanently timbered and permanent houses built for each.

An exhaust fan has been installed which will furnish ventilation for development work for some time.

A haulage engine, cylinders 18 inches by 16 inches with two drums 5 feet in diameter, 4 feet face geared 1 to 5 has been erected.

One cross-compound air compressor of 250 H. P. built by Walker Bros., Wigan, England, has been installed. Two B. & W. water tube boilers, estimated at 500 H. P. have been erected. A brick boiler house 62 x 46 feet and a brick power house 48 x 46 feet. are now in course of erection ; also foundation laid for a steel bank head.

The following buildings were erected during the year.

One hotel 100 feet long by 36 feet wide and three stories high, with ell 42 by 16 feet.

One hotel 90 x 34 feet, three stories high, with ell 31 x 31 feet.

One manager's residence, 36 x 33 feet, and three stories high.

Three miners' dwellings, 28 x 23 feet, one and a half stories high.

One brick magazine, 16 x 14 feet, with steel roofing.

The line of railway connecting the colliery with the Sydney and Louisburg railway was completed the latter part of the season, and is a great convenience in the transportation of machinery, lumber, etc., to the colliery.

About 200 men were employed during the greater part of the summer, building streets. A number of main streets, intersected by cross streets, have been built. The main streets are 85, and cross streets 50 feet in width, and enclose a large area of land upon which the future town will be built.

Building lots will be sold along these streets to the employees, and if desired, the company will erect dwelling houses on these lots, the owners paying for them in instalments.

I visited this mine twelve times during the year.

The average amount of air in circulation in this mine is 22,000 cubic feet per minute.

GOWRIE AND BLOCKHOUSE COLLIERY.

The levels in No. 1 panel were advanced 2,000 feet, and rooms turned off for this distance.

The deeps have been extended 1,200 feet below No. 1 panel, and passages driven through the barrier at this point, preparatory to opening up a new lift or panel.

The coal to the deep is of good quality, and with better shipping facilities, there should be no reason why this colliery should not take its place among the large producers in the near future.

I visited this colliery thirteen times during the year.

The average amount of air circulating through this mine is 22,500 cubic feet per minute.

DOMINION NO. 6.

EAST SLOPES.

Work in these slopes was suspended on August 12th, 1905. The distance from surface to face of slopes is 1534 feet.

No. 1 East level was driven 460 feet.
" 2 " " 150 feet,
" 1 West " was driven 560 feet.
" 2 " 120 feet.

NORTH SLOPES.

These slopes have been advanced 1500 feet during the year. The total distance to face of slopes being 1700 feet. Levels going east and west were turned off these slopes.

No. 1 east level was driven 530 feet, and No. 2 east level 450 feet, No. 1 west level was driven 250 feet, and No. 2 west level 400 feet.

At the entrance to these slopes concrete arching is being put in for a distance of 150 feet. As yet all coal cutting is done by hand picks, three shifts, of eight hours each, being worked.

A fan and fan engine have been installed. One 100 H. P. "Robb Mumford" boiler has been added to the steam plant. Six B. & W. boilers are on the ground and will be erected shortly.

A new brick boiler house with steel covering, also brick smoke stack 160 feet in height by 9 feet in diameter, have been erected.

A new machine shop has been built and equipped with up-to-date machinery. A haulage engine size of cylinders 14 x 20 inches with 6 feet drums, is being put in place to haul the coal from the main slope.

Railway sidings, temporary trestles, bankhead and screens have been erected. Foundations are being laid for warehouse, blacksmith shop, carpenter shop, tub shop and permanent bankhead.

A shaft 12 feet square is being put down to tap the Emery Seam at this point, and is at the present time down 100 feet.

MINERS' DWELLINGS.

Six double houses have been completed, and forty-five double houses and twenty single houses are under construction.

I made thirteen visits to this mine during the year.

The average amount of air passing through this mine is 23,000 cubic feet per minute.

CALEDONIA.

Development work at this colliery was carried on during the year as follows:

The east deeps were advanced 780 feet; No. 6 east levels 530 feet; No. 7 east levels 1090 feet; No. 8 east levels 1120 feet; No. 9 east levels 250 feet and No. 8 headways 600 feet.

No. 7 west levels in these deeps were extended 1130; No. 8 west levels 950 feet and No. 9 west levels 140 feet.

The west deeps were advanced 525 feet; No. 4 east levels in these deeps were extended 995 feet; No. 5 east levels 1250 feet; No. 6 east levels 610 feet, and No. 6 headways 440 feet.

No. 7 west levels in these deeps were driven 1190 feet; No. 7 headways 300 feet and No. 8 levels 175 feet.

Pillars have been extracted on Nos. 6 & 7 east and No. 7 west levels in east deeps and on No. 3 east and No. 5 & 6 west levels in west deeps, also in main west levels.

During the latter part of last season, safety lamps were supplied to all the men working in these pillars, and at the present time the whole mine is equipped with safety lamps, there being about 700 in use.

The average amount of air passing in this mine is 105,000 cubic feet per minute.

I made 19 visits to this mine during the year.

Dominion No. 2—Harbor Seam.

Development work in this and the Phalen seam has steadily advanced during the year. The deeps, levels and headways in this seam were extended as follows:

North deeps 1,680 feet, and south deeps 900 feet. The north levels were advanced 1,450 feet to the barrier separating this and the International Colliery.

No. 1 north levels were driven 1,350 and No. 2 north levels 1,100 feet. No. 1 levels south of north deep, 1,000 feet. South submarine levels, 1,250 feet. No. 1 south submarine levels off south deep 1,500 feet, and No. 2 south submarine levels off south deep 600 feet. No. 1 north levels, south deep, were advanced 1,300 feet to the barrier left for future deep mining.

The north headways were driven 1,400 feet along the International barrier.

The waterway from south side to lodgment was driven 400 feet.

A new air crossing was built across north deep, and thirty-five concrete stoppings put in, thus giving this deep a separate split of its own.

The airway between the Harbor main and material shafts and the No. 2 air shaft has been enlarged from an area ot fifty square feet to one of one hundred square feet. This will give area through which a sufficient quantity of air can be passed to air the Phalen or No. 2 mine from the Harbor seam fan should the Phalen seam fan be stopped. An engine has been placed on the south side, near the pit bottom, to haul the coal from the new lodgment.

The amount of air passing in this mine is 150,000 cubic feet per minute.

PHALEN SEAM.

Deeps, levels and headways in this mine were advanced as follows:

New north deep, 1.640 feet, and new south deep 780 feet. Main south levels, 1,280 feet; south barrier headways off northern levels, 610 feet; levels off south motor headways, 940 feet.

No. 2 incline headways 1270 feet.

South Motor headways 900 feet.

North Motor headways 890 feet.

No. 1 headways off No. 1 upper north level 1120 feet, and No. 2 headways off same levels 1450 feet. Main north levels 1230 feet, and Longwall levels 1720 feet. No. 1 incline headway off No. 3 landing 1180 feet. No. 1 levels off new north deep 1340 feet, and No. 2 levels off same deep 1260 feet. No. 1 levels off south deeps 520 feet. Barrier headways 950 feet and No. 3 incline headways 520 feet.

Three large air-crossings were built during the year, which give the Phalen seam four separate splits.

The airway from the end of the stone tunnel to where the air splits, has been increased in area from 56 square feet to 100 square feet. 36 concrete stoppings were built to make this change; this has largely increased the quantity and reduced the water gauge nearly one inch. The haulage in the north deep was extended 800 feet.

The motor roads were extended 1400 feet in No. 6 levels, 1500 feet up the north motor headway, and 1000 feet on No. 1 motor headway.

The south levels which were timbered with spruce and hemlock have been partly replaced with " 12 x 16 " hard pine. An elevator has been placed at the pit bottom. This elevates the coal which drops from the storage and hoisting tanks, and deposits it into a pit car.

Pillars are being extracted in four different sections in this mine, viz: north of old north deep, size of pillars being 90' x 55'.

North of north motor headway pillars being 90' x 45'.
" " south " " " " 90' x 45'.
South " " " " " " 90' x 45'.

These pillars are being very successfully drawn, there being practically no coal lost, which forcibly illustrates the advisability of leaving pillars of sufficient size to support the superincumbent strata with a view to their successful removal in the future.

The splendid results obtained from the removal of the pillars in this mine strengthen the view held by those who contend that so, far as the Phalen seam is concerned, the coal being eight feet thick with no bands or falling stone from which packs can be built, it is doubtful if longwall, were it adopted, would compare favorably with the present system, either in point of cost of production or amount of coal recovered.

In January last the open lights were removed from this mine and the whole mine equipped with safety lamps, there being at present 850 lamps in use. The same precaution was taken in the Harbour seam on July last, when the open lights were replaced by safety lamps, and at the present time 535 lamps are in use in this seam.

The safety lamps used in both pits are the "Ackroyd & Best," and are giving very good satisfaction.

A new head frame for the Harbour seam, man and material shaft, has been completed and a fan engine installed; also a new lamp house erected near No. 2 man and material shaft.

The amount of air circulating through this mine is 209,000 cubic feet per minute.

I visited these collieries 37 times during the year.

Dominion No. 3.

The slopes of this colliery were extended 1100 feet during the year.

No. 10 west levels were advanced 850 feet, and No. 10 east, 800 feet.

No. 11 west levels 1000 feet, and No. 11 east 900 feet. No. 12 west level 150 feet, and N. 12 east 150 feet.

Pillars were successfully drawn on Nos. 7, 8 and 9 east, and on Nos. 8 and 9 west levels.

The bankhead was remodelled and two rotary tipples erected, also haulage gear, manufactured by "Brown Machine Co.," installed.

In October 1904, the men employed in the removal of the pillars, together with the drivers, roadmen, etc., employed in these sections were supplied with Marsant Safety Lamps, and on June 1st, 1905, these lamps were taken out and the whole mine equipped with the "Ackroyd & Best" Safety Lamps, there being at present 600 of these lamps in use in this mine.

The average amount of air in circulation in this mine is 55,000 cubic feet per minute.

I visited this mine 18 times during the year.

HUB COLLIERY.

Development work in this mine was principally confined to the submarine section.

The main deeps were driven 1050 feet during the year making a total distance from the shore line to the face of 2570 feet.

At a distance of 2100 feet from the shore line, levels were turned off north and south, and headways started off these levels inside of the barriers and driven up to the line of 180 foot cover. From these headways rooms were broken off and worked, the coal proving to be of excellent quality and on an average 8 feet 9 inches in height.

The north side levels were driven 660 feet, and those on the south side 520 feet. Headways were started up the hill from these levels for rooms available for the shipping season of 1906.

At the end of the year 1905 the main deeps will be down a sufficient distance to allow another set of levels to be started.

A few rooms have been worked on the north side above the shaft level, and on No 2 and 3 landings on the land area; also a few pillars extracted in the Marconi section. But after the shipping season of 1905 all the work in the mine will be confined to the submarine area.

A new deep haulage engine, with cylinders 12 x 18 inches, with a drum 6 feet in diameter, holding 5,000 feet of $\frac{7}{8}$ inch rope, and capable of hauling 15 two ton boxes, was installed underground. To supply this engine with steam, a bore-hole 12 inches in diameter was put down to the engine room. A pipe 9 inches in diameter was put down through this hole and cemented on the outside. Through this pipe a 4 inch steam range was put down and the exhaust steam from the engine carried through the 9 inch pipe to the surface, the same borehole being utilized for steam and exhaust.

Two Norwalk air compressors, of 2,000 cubic feet capacity each, are now being installed for motive power in the mine.

The average amount of air circulating in this mine is 62,000 cubic feet per minute.

I made sixteen visits to this mine during the year.

INTERNATIONAL.

No. 4 levels were extended two hundred feet. These levels are to be driven through to the coal lying to the raise of the Stirling mine workings, and the coal conveyed to the surface by way of the International shaft.

Deeps have been started off No. 2 levels, which, in conjunction with the levels spoken of above, will open up new territory for next season's output.

It is proposed to have an endless rope system of haulage installed between this section and the pit bottom by the first of May next.

A slope has been driven from the rise workings through to the surface, for the purpose of ventilating this section of the mine,

The haulage was extended one thousand feet in No. 11 level, and a self-acting encline system of haulage twelve hundred feet in length put in, thus doing away with the expensive system of horse haulage previously used in transporting the coal from this section to the main rope.

About fifty pairs of miners have been employed during the year in extracting pillars on Nos. 4, 5, 7 and 11 levels.

A new hoisting engine, cylinders 15″ x 30″, was installed.

The average amount of air passing through this mine is 60,000 cubic feet per minute.

I visited this colliery twelve times during the year.

RESERVE—EAST SLOPE.

This slope was extended 1,270 feet during the year.

No. 5 south levels were driven 680 feet to the barrier separating this slope from Dominion No. 3 colliery.

No. 6 south levels were driven 1,070 feet to same barrier.

Pillars were extracted on Nos. 3, 4 and 5 south levels.

The average amount of air in circulation in this mine is 100,000 cubic feet per minute.

RESERVE—FRENCH SLOPE.

This slope was advanced 1,180 feet during the year.

No. 6 north levels were driven 500 feet to barrier between this and Dominion No. 1 Colliery. No. 7 north levels were driven 1000 feet to the same barrier.

No. 7 south levels were driven 750 feet, and No. 8 south levels 150 feet. Headways were turned off at this point and driven up 300 feet.

Pillars were drawn on Nos. 4 and 5 south levels, and on No. 5 north levels in this slope.

A new lamp house was erected and a Norwalk air compressor installed.

The average amount of air in circulation in this slope is 130,000 cubic feet per minute.

EMERY SEAM.

The Emery seam workings, which have been flooded with water during the past twenty years, were pumped out during the latter part of this season.

This seam underlies the Phalen seam 155 feet at this point, and is reached by means of a stone drift 9 feet wide by 6 feet high, and 700 feet in length, driven off the main slope at a point 850 feet from the surface. A shaft 9 feet in diameter also connects this seam with the main slope workings. The mine, which was only in the development stage when abandoned, was found to be free from falls, and therefore easy to clean up and put in readiness for hoisting coal.

The north levels are in 250 feet, the coal being five feet thick at this point.

The longwall advancing system has been adopted and was started about 200 feet from the bottom of the drift.

Two small pumps, pump the water from the mine up the shaft to the main slope workings, from which it enters the Dominion No. 1 water level, and is emptied into the sea.

The coal is hoisted up the main slope by the trip system of haulage and screened and loaded into cars from the same bankhead as the Reserve coal.

The coal in this seam is said to be one of the best steam producing coals in the Province, and was much sought after as a bunker coal when previously worked.

The successful operation of this seam will very materially increase the output, and insure a new lease of life to the Reserve colliery.

There are 30,000 cubic feet of air per minute circulating through this mine.

I visited these collieries 20 times during the year.

Safety Lamps and Explosives.

As will be seen from the above report, open lights have been discarded and safety lamps introduced in at least some of the collieries in this district. This must readily be admitted by all who have given the matter serious consideration to be a step in the right direction. When the fact is taken into consideration that our mines are rapidly advancing to the dip, and assuming proportions which a few years ago was not thought possible in so short a time, and when it is considered that during the summer of 1904, previous to the placing of safety lamps in the pillar sections, explosions of gas occurred in these sections at Caledonia, Dominion No. 3 and Reserve Collieries, which in each case was due to the gas which had accumulated over the falls coming in contact with the miners' naked lights. These explosions, though slight. go to prove, if proof were needed, that, notwithstanding the fact that in our smaller collieries quantities of air ranging from 23,000 to 60,000, and in our larger colleries quantities ranging from 105,000 to over 200,000 cubic feet of air per minute is constantly kept in circulation, it is quite possible, under certain conditions, for gas to accumulate in certain sections of our mines, and, where only open lights are in use, there is grave danger of accidents.

The officials of the Dominion Coal Company have recognized this fact, and though the expense must have been considerable, have during the past year equipped four of their larger collieries with safety lamps, viz., Dominion No. 3, Caledonia and the Harbour and Phalen seams in Dominion No. 2 Colliery. . Preparations are also being made to supply the Reserve Colliery with closed lights. When this is done, those of our collieries from which the greatest danger could reasonably be expected through the use of open lights, will be supplied with safety lamps.

The lamp used in Dominion No. 3 and in the Harbour and Phalen seams, Dominion No. 2, is the "Ackroyd & Best."

These lamps are lighted and unlocked by electricity. Relighters are placed in the mine at convenient points along the main deep haulage roads, and are composed of a storage battery incased in a small metallic box. The compartment in which the lamp is placed to be lighted is just large enough to admit the lamp. Having put the lamp in the proper position, the lid is closed tight, a small touch button on the back of the box is then pressed forward ; this makes the connection which lights the lamp. These lamps are giving good satisfaction.

The use of common black powder has been prohibited in the Dominion Coal Company's Collieries and Bobbonite introduced. Tests are now being made at the different Collieries of the Company with three kinds of explosives, viz : Acadia Pellet, manufactured by the Acadia Powder Company, Halifax, Bull dog and Bobbonite manufactured in England. These tests are conducted by the assistant Superintendent of mines, Mr. Christianson, the Manager of the Colliery at which the test is being made, the Deputy Inspectors and representatives of the workmen.

FIRE PROTECTION ASSOCIATION.

In January, 1905, the managers of the Dominion Coal Company formed a Fire Protection Association, with the Superintendent of mines as Chairman, and Jos. G. S. Hudson, Esq., as Secretary.

The organization is composed of all the mine Managers, who appointed three of their number, viz : Messrs. A. McEachern, N. McKenzie and A. McDonald, who are called the Inspection Committee.

This committee visit and inspect the surface and underground works of the different collieries every three months, and send a written report to the general Manager, as to the general efficency, conditions of fire protection appliances and equipment of the Colliery Fire Brigades.

At all of the collieries there are regularly organized Fire Brigades composed of about forty men in each brigade, divided between surface and underground. These brigades are officered by Captains and Lieutenants, having Secretaries who keep minutes of the regular brigade meetings and fire brigade practices.

Rooms have been erected and furnished at the different Collieries for the members of the different brigades to meet in. Attached to these buildings are compartments in which one or more hose reels, containing several lengths of hose, are kept in case of fire and for fire brigade practice.

The members of the different brigades take a lively interest in their work, and have already on more than one occasion demonstrated their ability to cope with fire and the necessity of an organization of this kind in connection with our collieries.

FATAL ACCIDENTS.

I am pleased to report that the number of fatal accidents in the southern coal mines during the year was not nearly as large as that of 1904. In producing the tonnage of 1904, 13 lives were lost in and about our mines. For every life lost 243,054 tons of coal were produced. While for the year covered by this report seven lives were lost, and for every life lost 434,630 tons of coal were produced.

The total number of employees in and about our coal mines was 5,075, and the number of fatal accidents per 1,000 was 1.37.

Our showing in respect to fatal accidents will, I venture to say, compare favorably with most of the coal mining centres.

In the report of the department of mines of Pennsylvania Bituminous Region for 1903, which is the latest report of which I have a copy, I notice 402 lives were lost. For every life lost 257,995 tons of coal were produced, and the percentage of fatal accidents per 1,000 was 2.65.

It will I think be admitted that in a mining district such as this, composed of large collieries, where the mining is principally done by machinery, that no matter how diligently the officials of the department or those of the collieries perform their duties, fatal accidents will occur. Such being the case, all that can reasonably be expected is that they be confined to those, which in the strict sense of the word may be classed as accidents, viz : accidents that cannot be foreseen or prevented.

This can only be accomplished by the officials strictly complying with the requirements of the "Mines Regulation Act," and insisting upon all workmen under their charge doing likewise, and by the workmen themselves, exercising due care in the performance of their work.

I append table of accidents, and remain,

Yours truly,

JOHN CADEGAN,
Deputy Inspector of Mines.

Accidents in Cape Breton Coal Mines, Southern District, Year ended Sept. 30th, 1905.

No.	Date	Mine.	Name.	Age.	Occupation.	Remarks.
	1904					
1	Oct. 25.	Caledonia	Alex. McKenzie	14	Door keeper..	Leg broken, caught between boxes.
2	" 28.	"	Jacob Bradbury......	24	Landing Tender...	Dislocation of hip, caught between boxes
3	Nov 15.	International.....	Wm. Morrison..	41	Miner	Back injured, fall of coal from face.
4	" 16.	Dominion No. 3.	J. D. McIsaac.........	36	Miner......	Hand bruised, jammed by box.
5	Dec. 24.	" " 2.	Earnest Morgan.....	21	Driver......	Back injured, caught between box and prop.
	1905					
6	Jan. 27.	" " 3.	Jas. T. McDonald.....	20	Driver..	Killed by fall of stone from roof.
7	" 27.	" " 3.	Rch. Brammell.... ...	34	Loader...............	Arm broken by fall of stone from roof
8	Feb. 2.	Reserve...........	Sandford Andrews...	25	Loader...............	Leg broken, fall of coal from face.
9	" 6.	Caledonia	John H. McVicar. ...	40	Shotfirer	Rib broken, jammed between box and prop.
10	Mar. 7.	"	John D. Keith	39	Miner.......	Hand and arm injured by premature shot
11	April 11	Reserve...........	Daniel Young.........	38	Miner.	Leg broken, fall of stone from roof.
12	" 12.	"	Doug. McPhee.........	55	Miner.................	3 ribs broken, fall of coal from face.
13	" 12.	"	Alex. McLeod.........	43	Fireman	Face burned, outburst of flame from furnace.
14	" 15.	"	Hugh McGillvary.....	32	Miner..................	Leg fractured, fall of stone from roof.
15	" 19.	"	John J. Laffin.	55	Shotfirer	Killed by fall of coal from face.
16	" 22.	Dominion No. 2	Hugh Walker.........	25	Motor driver..	Back injured, jammed between motor and old motor cab.
17	May 9.	Caledonia	Alex. Borden	65	Miner.................	Fatally injured, fall of coal from face.

Accidents in Cape Breton Coal Mines, Southern District, Year ended Sept. 30th, 1905.

No.	Date.	Mine.	Name.	Age.	Occupation.	Remarks.
18	May 11.	Caledonia	Geo. Spencer	55	Shotfirer	Face and hands burned by ignition of powder.
19	" 12.	Dominion No. 2	Jos. D. McNeil	25	Loader	Leg broken, fall of coal from face.
20	" 17.	Reserve	Nich Sellers.	21	Loader	Killed by fall of stone from roof.
21	" 26.	Dominion No. 2.	Laur. Fitzgerald	24	Shotfirer	" " " "
22	June 3.	" " 3.	Wm. Roberts	53	Miner	Back injured, fall of stone from roof.
23	" 3.	Caledonia	Mich. McNeil	35	Miner	Chest and side injured, fall of coal from face.
24	" 10.	Reserve	Neil McMullin	21	Helper	Fractured ankle, fall coal from face.
25	" 14.	Hub	Wm. McKay	24	Ch. runner	Foot crushed, jammed by box.
26	" 16.	Dominion No. 3.	Doug. McIntosh	30	Loader	Leg broken, fall of stone from roof.
27	" 20.	Caledonia	Alex. McNeil	56	Miner	Arm and ankle broken, fall of stone from roof.
28	" 22.	"	Jos. Maritto	20	Loader	Fractured ankle, fall of stone from roof.
29	" 30.	Dominion No. 3.	Mal. O'Hanley	22	Shotfirer	Foot crushed, fall of coal from face.
30	July 11.	International	Rich. O'Brine	17	Car shunter	Toes crushed by coal car.
31	" 12.	Reserve	Steve Russel	23	Loader	Fractured thigh, fall of coal from face.
32	" 17.	Dominion No. 3	Ernest Downs	38	Shotfirer	Hands and face burned, ignition of gas.
33	" 18.	" " 2.	Jos. McLeod	34	Overman	" " " " "
34	" 26.	Reserve	Jos. Contors	20	Laborer	Leg broken, caught by haulage rope.
35	" 27.	"	Chas. Black	19	Banksman	Wrist fractured, jammed between boxes.
36	" 29.	Caledonia	Dunc. McInnis	47	Miner	Killed by fall of stone from roof.
37	Aug. 9.	"	Ron. Ferguson	75	Miner	Injuries to back, fall of coal from roof.

38	Aug. 15.	Dominion No. 2.	J. R. Blue	35	Miner	Arm broken, fall of coal from roof.
39	" 16.	Hub	Jas. Walsh	20	Driver	Wrist fractured, jammed between boxes.
40	" 19.	Dominion No. 3.	Jno. Marsh	39	Miner	Dislocation of hip, fall of coal from roof.
41	" 25.	" " 2.	Val. Guthro	29	Miner	Fractured spine, from fall of coal from roof.
42	Sept. 2.	" " 3.	Owen Micholas	28	Miner	Dislocation of hip, fall of coal from roof.
43	" 10.	Dominion No. 2.	Mal. Steele	55	Shotfirer	Fatally injured, premature shot.
44	" 20.	International.	Jos. Morrison	36	Miner	Leg cut, fall of coal from face
45	" 28.	Dominion No. 2.	Dan. McGillvary	35	Mch. runner	Arm broken, fall of coal from face.

GOLD AND OTHER METAL MINING.

The production during the year 1905 from the gold mines proper amounted to 15,549 ounces, as compared with 14,270 ounces produced during the year ending September 30, 1904. This, however, does not include the gold contained in the antimony ore from West Gore.

The appended report by Mr. D'Arcy Weatherbe, C. E., Deputy Inspector, on examinations and inspections at the metal mines, show the amount of work performed there during the year. He has also compiled a statement on the antimony industry, the smelting of the ore, separation of gold, etc., which will prove of interest.

He has submitted a report on the progress made in iron mining, and notes on other minerals.

He also gives a detailed report on the operations of the government drills during the past season.

ANNUAL REPORT ON THE GOLD AND METAL MINES.

FROM SEPTEMBER 30TH, 1904, TO SEPTEMBER 30TH, 1905.

To DR. E. GILPIN,
Deputy Commissioner and Inspector of Mines :

Sir :—

In handing you the report on the gold mines for the past year, I regret to call attention to the fact that although the actual returns for the year were slightly in excess of the previous season, they are, with this one exception, lower than for any similar period since 1894, an interval of 11 years. Indeed, without the returns from the Richardson Mine, which last year produced nothing, and this year gave over 2,000 oz., the returns would have been the lowest for 25 years

Moreover, the industry generally has fallen off to a very marked degree, and with the closing of Dolliver Mountain, Brookfield (one of the most regular and largest producers for the past 12 years) the Bluenose, N. S., and Mexican, Ecum Secum, Wine Harbour, etc , and the serious falling off in the returns from Caribou, Nova Scotia, gold mining operations present a gloomy aspect.

MR. T. A. RICKARD'S VISIT.

It was perhaps at a suitable juncture that the Government, at the instance of the N. S. Mining Society, (ever zealous as regards the furtherance of gold mining interests), employed one of the most eminent mining engineers of the day to report on the gold fields. I refer to the visit of Mr. T. A. Rickard during the past summer. In July, a flying visit satisfied him that there was really an interesting field for examination, and early in August I was asked to arrange the details of an expedition. At the outset, in arranging the itinerary it seemed unfortunate that certain typical mines were full of water. However, after considerable trouble and expense the Dufferin Mine at Salmon River, and the Westlake pits at Mount Uniacke were unwatered, and a long tunnel at the granite contact at Middle Country Harbour was cleaned out. It would have been desirable, perhaps, to have seen the interior of other mines, at the time full of water, but it was found impracticable for many reasons to pump them out, and I feel satisfied that quite sufficient was seen and enough reliable data collected by Mr. Rickard for him to arrive at any conclusions contained in his report.

Pending its publication, it would be entirely unfitting for me to venture any remarks or comments on the ends sought.

Mr. Rickard arrived on the 16th of August, and practically every working district was visited, and many examinations made of the country passed through.

The managers and others in connection with the mines provided every possible facility for exhaustive inspections, which was taken due advantage of.

The districts visited were as follows:—Montague, Waverley, Renfrew, Oldham, Mount Uniacke, Caribou, Salmon River, Harrigan Cove, Goldenville, Cochran Hill, Forest Hill, Middle Country Harbor, Isaac's Harbor, Goldboro, Lower Seal Harbor, West Gore, Leipsigate and Brookfield.

The time occupied in the work was from August 16th, 1905, to September 13th, 1905, on which latter date Mr. Rickard left for New York.

While in Nova Scotia he had the advice of all contemporary expert evidence available, and numerous maps, plans, statistics and literary matter on the subject were placed at his disposal.

PLANS AND RECORDS.

The plans of the various underground workings have, wherever possible, been brought up to date and filed at the department, and those of some new mines have been added.

A quantity of data relating to old and inaccessible workings, and information respecting gold mining generally, has been collected through the Province, and added to a stock already contained in private note books and plans, and it is hoped that at a later date some of this may be systematized and published in a useful form,

These pages have for several years attempted to emphasize the importance of having in the Government's possession accurate plans and records relating generally to the mines and to the size, value and general characteristics of the ore bodies in workings about which the present generation have only a garbled history, generally inaccurate and flavoured from senile imagination.

Unfortunately a great deal of this sort of information has been used, not only to influence capital, but also by intellects brighter than the average, upon which to base elaborate theories which prove unpractical in actual mining.

The department could, at a comparatively small cost, officially collect and record data along such lines as above indicated in actual working mines *today!* Tomorrow, the opportunity will be lost forever, as has been the case in the past.

During the 45 years of gold mining in Nova Scotia, the amount of useful fact that has been officially collected upon which one can rely, is extremely meagre. Official verification of underground plans, with the addition of necessary information, could easily be made with little difficulty, and in cases where there was danger of workings being abandoned, and filled with water, the Department itself could make the surveys.

SAMPLE AND ASSAYING.

It has been generally assumed locally that sampling and assaying, as it is understood in the large mining centres of the world, is useless in the gold mines of this Province, on account of the erratic occurrence of the gold in pockets and the general irregularity in ore values. Certainly in many mines, this fact might present a serious difficulty, but it is doubtful if at the majority of the larger mines intelligent sampling and careful assaying would not prove of great benefit.

It certainly has proved to be so in one important case during the past year, where it was ascertained *practically* that for years, that portion of the ore-body which had been extracted along the anticlinal axis, should have been left in the mine at a profit, and this in direct contradistinction to the published theory of an accepted authority, who had doubtless based said theory on such evidence as is mentioned above. As a guarantee of his good faith, however it should be stated that the data he obtained was, through the need of reliable records, probably the best available at the time.

ACCIDENTS.

I regret to record several fatal and minor accidents during the year. The causes were hoisting conditions, falls of rock and dynamite explosions.

PROPOSED CHANGES IN METALLIFEROUS MINING REGULATIONS.

With regard to securing a higher efficiency of safety in the working of the mines, the time has arrived for certain changes in the regulations which I would suggest as follows:—

RECORD OF ACCIDENTS.

The management should be required to keep at the mine, a book in which shall be entered in the scheduled form now provided for *return of accidents*, a complete list of all accidents, fatal or otherwise, occurring during the year and this list should give all particulars relating to causes

Lessons may often be drawn even from the most trivial cases and the personal discussion that could be carried out on the spot, should prove beneficial in arranging for future prevention under similar circumstances.

EXPLOSIVES.

This matter was referred to by me in detail, in the report for the year ending September 30th, 1903, and need not again be gone into technically.

Suffice it is to say that the present rules are entirely inadequate, particularly as regards thawing and magazines.

At the mines of a certain company employing over 200 men, the main magazine, containing at one time 6 tons of dynamite, was situated less than 100 ft. from the company's office and other buildings close at hand. Any one who has seen the effect in general demolition of a hundred lbs. or less, even when unconfined, can estimate the fearful damage caused by an explosion of the above amount.

At this same mine the dynamite was stored carelessly through the working, and the two methods chiefly used in thawing, and apparently not considered unsafe by the management or men, were, with a *naked* light inside an old oil can with the "powder" in a tray above, and by heating the cartridges on an iron shovel with an open light underneath ! ! This last method was, to say the least of it, bold.

A reference to the regulations governing mining in British Columbia, Australia, Ontario, Colorado and Cape Town, etc., will show that both the conditions surrounding explosives and the safety of men in shafts are generally dealt with fully.

EXPLOSIVES.

SURFACE RECOMMENDATIONS.

The contents of the main magazine should be limited to a certain amount.

The distance from the nearest inhabited building or to any valuable mine property should be increased to, say 500 feet.

Only one man should have charge of the key, and he should be responsible for the conditions surrounding the magazine.

It should be kept thoroughly clean, and the boxes should be opened outside, and they and the packing burned as soon as opened. No other combustible, such as oil, fuse, detonators, caps, etc., should be kept in the same building.

It should be painted outside in such a manner as to warn strangers of the danger.

It should not be situated so as to be in danger from brush or other fires.

It should not be opened or entered by anyone carrying an open light, or smoking, and no open light or pipe, matches, etc., should be allowed nearer than a specified safe distance.

No steel, iron, or other substance likely to produce undue friction should be placed in the building.

With regard to thawing houses, the rules should be practically the same, though the amount carried therein should be considerably less, and a closer distance might be allowed to other buildings.

One of several approved methods of thawing should be insisted on.

The method of construction of the buildings is of course a matter of opinion to a certain extent, some favouring an underground magazine, others one built of solid masonry.

Personally, I am of the opinion that a light water-proof and fire-proof building (corrugated iron with wooden lining is good) placed in a hollow, the sides of which may deflect the forces of an explosion, is the best.

Under Ground

Not more than one shift's supply of powder or dynamite should be taken into or stored in any mine at one time and in no case should more than 50 lbs. be stored therein. All powder taken into a mine should be carried in cannisters or covered receptacles specially provided for the purpose, and these should not contain more than 50 lbs.

The place of under ground storage should be a safe distance from any working face, travelling road or haulage way, and the explosive should be kept in a locked box under the sole charge of the shift boss, or some other person specially appointed. All oil, caps, fuse detonators, etc., should be kept in an entirely separate and safe place.

The place of storage underground should be dry and the temperature, where possible, should not exceed 125 F. or be less than 60 F.

Shaft Ladderways, Hoisting Engines, Etc.

The main principle governing the revision of the existing regulations on these points, should be that human life is of paramount importance.

Therefore, mines should be divided into those in which men may be lowered and raised in the shaft by an engine, and those in which an entrance is only allowed by a ladder or travelling way.

I would suggest the adoption of the rules in force in Ontario, modified as follows :—

Workmen may not be lowered or hoisted in shafts, winzes or other underground openings of a mine under any of the following conditions:—

(*a.*) In cages, buckets or tubs where a crosshead is not provided as a guide for the rope or cable.

(*b.*) In cages, buckets or tubs which slide on skidways or other guides.

(*c.*) In skips.

(*d.*) In cages, buckets, tubs or on cages which are not provided with a hood over them, or with a secure guard wall or housing of logs, boards or masonry around and extending at least two feet above the level of each and every landing and loading stage, platform or station floor in the shaft or winze.

(*f.*) Where no detaching hooks or other safety appliances are employed to prevent overwinding.

(*g.*) Where the hosting engine used is provided with less than two brakes.

(*h.*) Where the rope or cable passes through blocks instead of passing over a sheave of diameter suited to the diameter of the rope or cable and properly mounted on a secure head-frame.

(*i.*) Where the lowering and hoisting mechanism consists of a derrick, horse whim or hand windlass.

There shall be attached to every hoisting machine a brake adequate to hold or check when in motion, at any point in the shaft, the weight when filled with ore of the skip, bucket or other vessel used for hoisting or lowering, when such skip, bucket, etc., is in motion.

No person shall ride upon or against any loaded car, cage, bucket or tub in any shaft, slope or plane in or about any mine.

It shall be the duty of the manager, captain or other daily competent officer of every mine to examine at least once every day all slopes, shafts, main roads, travelling ways, signal apparatus, hoisting ropes and connections engines, pulleys, etc., in order to ascertain that they are in a safe and efficient working condition, and to note in a book kept for the purpose the condition of same.

The Inspector or his Deputy shall be empowered to test all hoisting engines in the manner above noted, and the cost of any resulting damage, through inefficiency in such engine or connections, shall be borne by the person or persons or company working the mine.

All shafts are to be provided with an efficient ladder-way.

In shafts inclined at a steeper angle than 45° the ladders shall be placed at the most convenient angle allowable, and shall, in no case, be at a less inclination than 80° to the horizontal, and the ladderway shall be provided with adequate platforms at intervals of not more than 25 feet apart.

In shafts inclined at less than 45°, an efficient hand rail shall be provided.

BOGUS COMPANIES, ETC.

With regard to bogus companies operating, or attempting to operate in the Province, I fear the evidence is ample to show that they are increasing, and that their acts are more flagrant than in the past.

Many letters have been received by this Department from investors in the United States and elsewhere enquiring about the prospects of companies which have never raised, or intended to raise, a pound of ore in the Province, and an interesting but damnatory collection of prospectuses issued during the past few years could easily be made of companies who have never operated or intended to operate mines.

I am not referring to companies where *bona fide* effort has been made, but to those whose watered stock has been hawked about and sold at ridiculous figures to any gull who could be induced to buy.

One new prospectus of a company incorporated in Maine, and capitalized at a million dollars, I have before me now. After recklessly misquoting, it bases its whole scheme of future profits on an alleged past average production for the district, in which it is supposed to operate, entirely erroneous and greatly in excess of the real average, as shown by the official returns at this Department.

The following detailed report shows the progress for the year :—

DETAILED REPORT.

GUYSBORO COUNTY.

Lower Seal Harbour.

A new and promising discovery has been made at this place during the year.

Nearly forty years have elapsed since the first rich " drift " was found between the site of the present mines (Beaver Hat Co., and Seal Harbour Co.), and the shore, about which so much excitement resulted.

At intervals since that time much prospecting has been carried on and it is estimated that considerably over $20,000 has been expended in this work. A large amount of auriferous float or "drift" has been discovered, some of it immensely rich, but up to the time of the present discovery no ore-body in place had been found.

During the past few years Mr. G. J. Partington, now representing the Seal Harbour Mining Company, and Mr. Percy J. White have been following up the past work, and in the summer of 1904, Mr. White uncovered a wide series of auriferous quartz veins in a 70ft. trench, on area No. 280, close to the boundary line between his property and that of Mr. Partington.

This was followed by the opening of two pits about 80 feet to the eastward, and almost immediately after by the discovery by Mr. Partington, of the same ore body, just west of the boundary line.

Beaver Hat Company.

This company, representing chiefly capital in Sydney and Glace Bay, was formed to work Mr. White's property.

After some little work near the surface, a shaft was sunk about 100 feet east of the discovery trench.

The strike of the measures here varies from N. 59° W. to N. 61° W. and the dip between 65° and 73° at different points in the openings. The shaft is 55 feet deep.

At 35 feet, cross-cuts were driven south 35 feet and north about 20 feet. A drift was made west from the shaft on a slate belt for about 25 feet.

Later on another cut was taken out underneath the south cross-cut, and connection was made from the cross-cut with another shallow pit a few feet east.

A drift has been commenced at the south end of the cross-cut running east, and a shaft is to be sunk further east, to connect with it.

The cross-cut south of the shaft is a continuous series, or stockwork, of quartz veins and country-rock (chiefly quartzite), and the face is still in ore. Crushings from these workings to September 30th, showed 307 oz., from 446 tons.

A small hoisting plant and a 5-stamp mill were erected during the summer.

The Seal Harbour Mining Company.

G. J. Partington	Manager.
Dan. McAskill	Foreman.

The main shaft of this company is situated only a few feet west of the boundary line, and a few feet north of the slate belt exposed in the Beaver Hat Company's shaft.

The pit is 65 feet deep. At 35 feet a cross-cut has been driven south for 87 feet, and is still in ore in the face. The deposit represents much the same general characteristics as in the Beaver Hat Company's works, with the exception that here the ore-body appears to be pitching west at a low angle.

At 70 feet west of the cross-cut another shaft has been sunk on the slate belt mentioned above, and this is connected with the cross-cut by a drift. The shaft is now being sunk below the drift. Another drift, 15 feet wide, on a slate belt, has been driven on for 15 feet at 55 feet from the shaft.

It is in these two drifts and the west shaft that evidences are afforded of the apparent westerly pitch of the ore body.

Mill tests of the ore from these workings have also shown good results, particularly when the magnitude of the ore body is taken into consideration.

The intention is to continue the sinking of the western shaft to a depth of about 200 feet, and then to cross-cut south.

A ten-stamp mill is in course of erection, and a small stamp plant is used in hoisting.

Isaac's Harbour.

Boston-Richardson Mining Company.

H. S. Badger	Manager.
John Thornham	Foreman.

The vertical shaft was continued through the Richardson ore-body, and a station made at 400 feet; cross-cuts were driven round on each leg. A large pillar is left behind the shaft; and during the winter, connection was made from the stopes above the south level with the old workings.

The underground workings were practically idle between April and June, the plant was overhauled, and many minor repairs and improvements made.

Two new boilers, 100 H. P., both constructed by I. Matheson, were installed, and a large saving effected in the fuel consumption—a very important item here. Experiments were conducted in the bromo-cyanide process by Messrs. Badger and Brown, and 6 Wilfley concentrating tables were purchased from the Dolliver Mountain Mining Co., and installed in the mill.

Mr. Badger assumed charge about June, and with Mr. Brown's assistance, a through system of sampling and mill testing has been instituted, and has already proved of immense benefit in bringing to light the fact that here, as probably is the case elsewhere in the Province, a very large percentage of rock (so-called ore) was mined and milled which should have been left in the mine.

To aid in this work a very useful and ingenious model of the mine has been prepared by Mr. Brown. It is made of plaster, and accurately depicts the workings to scale.

WORKINGS.

The south leg dips at 65°, and the level is 320 feet from the shaft. The north level is 360 feet from shaft, and the north side dip varies from 69° to 75°.

A large amount of ore was stoped out over the crown, and stoping is being carried back to the level faces.

Contrary to the practice in the old workings, the ore is worked entirely by the overhand method.

The future plan is, if mining operations can get far enough ahead of the mill demand, that a series of large stull timbers will be placed above the levels, and covered with heavy lagging poles. At intervals, strongly cribbed chutes will be built, and the spaces between will be left partly filled with ore (as a reserve and for the men to stand on), no timber being used in the stopes.

The mill has latterly been running 30 stamps, and crushing at the rate of about 3 tons per stamp.

The bromo-cyanide plant is now running regularly, and has a capacity of about 20 tons.

Dolliver Mountain Mining Co.

Sinking continued under the Deep Mining Act until October, and was discontinued during that month.

A depth of 488 feet was gained, and several ore-bodies were cut in the sinking. In November, a contract was made with the Sullivan

Machinery Company to drill from the bottom of the shaft in prolongation of the anticlinal axis (about 4° 30' south of vertical). This was put down for 500 feet, and though several bodies of quartz and slate were encountered, the results, as is often the case, were unsatisfactory.

Shortly after this work, the mine was allowed to fill with water, and has since remained idle.

Forest Hill.

Modstock Mining Co. and Strathcona Mining Co.

J. C. McDonald................................Manager.
J. Mason.......................................Foreman.

This mine was reopened in May, 1905, after several years idleness. Both properties are at present apparently under one management, and the chief work is being done on the Schoolhouse Lead in the Strathcona works, although surface prospecting is being carried on at several points throughout the district.

An old shaft (the Eastern shaft) on the Salmon River Lead, about 200 feet deep, has been pumped out and some exploitation work is to be done there.

On the Schoolhouse lead the East shaft is down 277 feet, and at 260 feet a drift connects with the Compressor shaft 550 feet west of the East shaft.

The Compressor shaft is 377 feet deep. At 350 feet a drift is in east of the shaft for 110 feet, and a block of ore above this drift 20 feet high and extending 60 feet from the shaft has been removed.

From the 260 feet level a raise has been made to the 206 feet level workings at 50 feet east of the shaft. The 206 feet level is in east for 180 feet, and from here it is carried 105 feet further east on a few feet higher level. From this latter face the ore has been stoped back to the shaft at the 136 feet level by the overhand method.

From a point 130 feet in the shaft the ore has been stoped out underhand to the surface for a distance of nearly 300 feet east of the shaft.

On the west side of the shaft the 206 feet level is driven 136 feet and from there the ore is stoped out westerly, also by the underhand method to the surface at a point about 300 feet from the shaft.

The Modstock shaft is 215 feet deep, and drifts are in a few feet each way at the bottom. No work has been done since the last inspection, and the workings measure as follows:

Above the 126-feet level the ground has been stoped out each for 71 feet, and only a short distance separates the workings of the Strathcona Company, above described, to the eastward.

At 370 feet in the Compressor shaft, a horizontally-inclined fault, dipping at a low angle south, and pitching at an angle of between 1 in 9, and 1 in 10, to the eastward, intersects the Schoolhouse lead, and contains itself a small quartz angular or cross-lead.

Two other shafts, the Schoolhouse, (300 feetdeep, 1,700 feet west of the Compressor shaft), and the Phœnix (114 feet deep, and 2,500 feet west of the Compressor shaft), are intersected by this flat fault, the Schoolhouse at about 200 feet in depth, and the Phœnix at 107 feet from the surface. In each case, the slate bed containing the Schoolhouse lead, which normally is about 3 feet wide, and dips at 72 degrees north at the top, flattens and widens (in the case of the Compressor shaft to 7 feet) on approaching this fault. Below the fault the bed dips almost vertically, and is only shifted a very inconsiderable distance north.

No new plant has been added since the last report was made.

Cochran Hill.

California Gold Mining Company.

George McNaughton..............................Manager.
Stephen Monk...Foreman.

There are 13 men on the pay-roll.

Work was discontinued in November 1904, but re-commenced on May 1st, 1905.

The work done in the old shaft mentioned in last year's report was on the " Hard " lead.

The shaft is 80 feet deep, and the ore was worked out from the shaft bottom to the surface on each side of the shaft by underhand stoping.

Levels have been driven 100 feet west, and 60 feet east, at the bottom of the shaft.

In the east level there appears to be a twisting of the strata to the south.

On the Mitchell belt the shaft is 150 feet deep, and at a few feet above the bottom a drift is in east 40 feet. There are two leads in the belt, but the quartz in this face appears to "peter out."

At 30 feet in the shaft a small block of ore was stoped out on the east side.

At 100 feet a drift has been driven west for 70 feet. About half-way form the shaft to the face, in this level, a fault was encountered, crossing the strike obliquely from north-east to south-west. This fault was followed by a cross-cut for 42 feet; and at 35 feet, what is supposed to be the same belt, was followed west for a distance, as stated, of 70 feet from the shaft. The belt is of slate and contains a large percentage of quartz.

The ore was stoped out from this level to surface on the west side of the shaft to the fault.

Another shaft 70 feet deep and 100 feet west of the above shaft is connected with it by shallow workings, and half-way between them a cross-cut was made from these workings for a distance of 50 feet north. At a depth of 60 feet, in this west shaft, a drift is in 90 feet west.

A new five-drill Rand compressor has been added to the equipment of the mine.

The 20-stamp mill was, at the time of my visit, being overhauled, preparatory to crushing.

Wine Harbour.

Old Provincial Mining Company.

S. R. Heakes....................................Manager.
John Boland.............. ....Foreman.

There are 60 men employed.

The mine was idle most of the winter. A new seven-drill compressor was installed, and several Sullivan machine drills are employed in the mine.

The hoist is an electric machine, and two large triplex electric pumps, one at the 286-foot level, and one at the bottom, handle the water. The ladderway compartment in the shaft has been remodelled and is not as wet as it was.

A new main magazine is being constructed, and the thawing house is to be changed, according to instructions. The thawing at present is done by an electric heater, and the temperature is said not to go above 70 Fahrenheit with this.

A sketch of the ore deposit may be of interest:

ORE DEPOSITS AND WORKINGS.

The mine is situated on the eastern pitch of an ore shoot known as the Plough lead, which, cropping at a point some 1,100 feet to the westward of the Old Provincial Company's shaft, has been worked from the surface by an open cut to a depth said to be over 100 feet, by operations carried on many years ago, and to a depth of 230 feet, at a point 600 feet west of the shaft of the Old Provincial Company, by subsequent working of the Plough Lead Mining Company. These have recently been closed, and are now full of water. From several careful examinations of the ore body in these western workings, it may be generally described as a zone of the regular and comformable quartzite beds forming the country rock, and including some bands of slate, the whole thickly intersected with stringers and short lenses of quartz connected by angulars which show a tendency to enter the beds from the north-west and follow with them. Treated as one workable proposition, this zone may be said to dip to the south at a steep angle, probably about 85 degrees, and pitch east at about 20 degrees or thereabout.

The south wall or hanging-wall is smooth and clearly defined throughout all the workings, and is closely followed by a small but very persistent vein called the " Little South " lead. This vein varies in thickness from 1/2 in. to 6 in. swelling in size when following through the main portion of the ore-shoot.

The Plough belt is apparently richest in that portion containing the Little South lead, and pinches down at the bottom to a very narrow belt.

In the workings of the Plough Lead Mining Company it is about 80 feet in height vertically, and varies from 35 feet down to a foot or two in thickness.

The Old Provincial Company commenced sinking a shaft on area 39, and about 170 feet from their western boundary line, to intersect the ore body described above, on its eastern pitch.

In March, 1903, this shaft had reached a depth of 352 feet, and a cross-cut was driven south to the hanging-wall of the Little South lead. Drifting was carried on following this wall, east of the shaft 60 feet, and west to the boundary about 167 feet.

This excavation is from 10 to 15 feet in width.

A raise was made at the west end of the workings on this level for 24 feet to prove the continuance of the ore-body to the " rise " on its pitch. Also two cross-cuts were driven north, one at 60 feet west of shaft for 20 feet, and the second in same direction at 138 feet from shaft for 16 feet.

These cross-cuts intersected from 10% to 15% of quartz.

The shaft was deepened to 400 feet, and a cross-cut was made to the hanging-wall of the Little South lead, and this lead was driven on for 95 feet east, and 107 feet west.

The main body of ore was worked from the cross-cut west for 50 feet, and stoped out between this level and the 352 feet level. A large pillar was left in west of this shaft.

Goldenville—Sherbrooke.

Royal Oak Mining Co.	Col. Evans....................................Manager. Gardiner McKenzie..............................Foreman.

The workings on the " Zwicker Big " lead have been extended as follows :—Connection was made on the 400 feet level east with the old workings pumped out last year.

All the ore in the shoot between this level and the bottom of the old working—a block about 120 feet long by 90 feet high—was stoped out. A fault pitching east at about 45° crosses the shaft and cuts the workings on the 400 feet level, about 125 feet east of shaft. The effect is to throw the beds east of fault about 8 feet north.

The cross-cut on the 400 feet level cuts the McKenzie belt at 33 feet south of Zwicker belts, and has been extended south to the Blue lead 80 feet from the Zwicker belt.

A drift has been run easterly on the Blue Lead belt for 238 feet to the fault mentioned above.

The ore-shoot on the Blue lead is intersected in this drift, and lies between points 110 feet and 235 feet respectively east of the cross-cut.

At 110 feet from cross-cut a winze is being sunk into the ore-body and is now 52 feet deep.

The ore contained in the shoot above the drift has been stoped out up to the old workings 50 feet above.

The shoots in this lead and the Zwicker appear to pitch westerly at angle of about 35° to 40°.

At the Jumbo and Hayden workings a boiler explosion in the spring temporarily caused a cessation of work.

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The Bluenose Mining Company have been idle, and the mines full of water, since the last report.

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Nova Scotia and Mexican Mining Co. A. G. McNaughton............................. Manager.

These mines were also full of water at the time of my last visit, and had been so for some months previous.

The company did considerable work, as shown on the underground plans, since the last report was made, and during the winter constructed certain water power works at Liscomb Falls, and cut out the line and put up poles for an electric transmission from the Falls to Goldenville, a distance of seven miles.

The dam is situated at the gorge at the head of the Falls, and is about one mile below the Big Stillwater. It is constructed of cribwork, the logs in which are 18 inches diameter, faced with three-inch plank. The width at the apron is 22 feet. and the total width 94 feet. The height in front is 12 feet. The sluice is 20 feet wide by 9 feet high, and built of 3 x 6-inch plank, champered on the inside to catch silt, and laid flat and spiked.

The floor of the dam is of 3 x 8-inch deal, resting on log cribwork, and at every 10 feet are collars of 6 x 3-inch scantling, bolted with one long bolt from side to side of the sluice, and held together at the top by two 3 x 6-inch pieces. Every second collar is braced at the side. The bottom of the sluice, at the dam, is 4 feet below the roll of the dam at the apron. The length of sluice, including penstock, is 230 feet, measured from the dam, and the horizontal distance from penstock to wheel (for iron flume, not yet installed), is 52 feet. The total head from roll of dam at apron to wheel is 39 feet. The power house is 49 x 59 feet.

No hydraulic or electric machinery has been yet installed, though a quantity of the latter has lain for several months on the wharf at Liscomb.

A boarding house has also been erected.

HALIFAX COUNTY.

Harrigan Cove.

Harrigan Cove Gold Mining Co.

Munro Archibald	Manager.
Fraser	Foreman.

Only 6 men were employed at the time of last inspection.

The east shaft was deepened a few feet, and but very little other work was done on the belt on which the shaft is sunk.

The cross-cut on the south side of belt on the 100 feet level has been extended south to another lead. The lead cut last year in this cross-cut at 69 feet was drifted on east for 165 feet.

On the north side of the level opposite this cross-cut another cross-cut was driven north for over 200 feet, and is still in process of driving. This tunnel has intersected some 25 quartz leads, most of them accompained by slate belts.

Only one however has been worked. It is a 4 feet slate belt carrying about 30% of quartz, and has been drifted on east 48 feet and west 66 feet. It is intersected about 105 feet north of shaft.

It is contemplated erecting a 20 stamp mill with foundations for 20 more. No new plant has been installed during the year.

Salmon River or Port Dufferin.

Montreal-London G. and S. Development Co, Limited.

The mine was pumped out in May for examination and was kept unwatered by the Department to allow Mr. T. A. Rickard to examine it in August. After that the mine again filled.

Caribou.

Baltimore & N. S. Mining Co.

L. W. Getchell	Manager.
F. D. Darragh	Surface Foreman.
S. C. Thomas	Underground Foreman.

Work at the mine temporarily ceased in January, 1905, and the Government drill (No. 2) was employed to prospect both underground and on the surface. An account of this work will be found elsewhere in this report, in the record of boring for the year.

Mining was again resumed after the drill had finished.

During the period from September 30th, 1904 to September 30th, 1905, the underground work has been confined to the levels below the No. 3 or 700 feet level.

Above No. 4 (winze, or 800 feet) level, the stoping was finished on the west side of the winze.

The No. 5 (winze, or 900 feet) level has been extended east, and the bulk of the ore in the shoot between this level and the 800 feet level was removed.

Stoping was also extended on the west side of the winze on No. 5 level.

Practically all the ore contained in the shoot proper has now been worked out between the 900 feet level and the surface.

The winze has been sunk an additional 100 feet, and the No. 6. (winze, or 1000 feet) level has been driven about 200 feet west of the winze.

The quartz along this level varies in thickness from 6 inches to 3 feet.

It is expected that the thickest part of the shoot is still farther west, and driving in this direction is therefore in progress.

The task, however, of raising ore from such a distance, and through 300 feet of winze with the aid of an auxiliary hoist, thence tramming to the main shaft where it is again hoisted to the deck, necessitates much handling, and must necessarily greatly increase the cost of production in proportion to the value.

Application has therefore been made to the Department for aid in reaching this ore body directly from the main shaft.

A little exploratory work was done on several of the beds intersected in the cross-cut, but apparently none of them were considered workable.

With the exception of the drilling mentioned elsewhere, no new work has been done on the surface.

Moose River.

Touquoy Gold Mining Co.

R. Kaulbach........................ ....Manager.
J. Flemming............. ....Foreman.

The vertical shaft has been sunk to a depth of about 185 feet, and besides the cross-cut at 122 feet, before reported, another has been driven at a depth of 170 feet for a distance of 125 feet north of the shaft, and 107 feet south of the shaft.

At a distance of 45 feet south from the shaft a drift was run east 45 feet, and intersected the ore-shoot containing the corrugated quartz, which had been worked from the surface down to a point 12 feet above the end of this drift. A raise was made to connect with the old workings, and the small body of ore remaining above was worked out. A winze also was sunk here for a depth of 25 feet, to follow the "shoot" on its pitch, south-westerly. A horizontally-inclined fault, which shifts the strata below the fault plane about 8 feet to the north, was encountered in this winze.

Further to the south in this cross-cut two drifts were made, the first 55 feet east and 25 feet west, and the second a few feet east; both on bodies of quartz supposed to correspond with the "Jumbo" and others met with in the cross-cuts in the upper workings.

It is proposed now to drill a bore-hole north from the north end of this cross-cut to locate the Britannia lead, and to generally prospect the ground in that direction.

All the work done underground during the year is included in the above description.

On the surface the flume to the 15-stamp mill is being repaired and three new mortar boxes are being put in to replace the old ones.

The G. and K. Company.

The sinking on the Meagher belt which was reported last year has reached a point 160 feet from the surface. This length is measured on the dip, an inclination of about 36°.

At 150 feet from surface, levels have been driven about 90 feet in each direction on the ore body. Back stoping has been carried from the ends of the level up to the shaft.

At a short distance east of the shaft a cross-cut was driven north 50 feet to the Archibald lead intersecting at 15 feet from the shaft another small lead. Both of there veins are very small and exhibit beautiful corrugations.

This cross-cut has also been driven 15 feet south of the level, and cuts two small leads close together.

The 40 stamp mill is completed, and has been running a few months.

A very sad accident occurred here early in the spring by which James Bishop, the well known mill-man lost his life. He was engaged near the shaft when his clothing by some means caught, and his body being whirled round the shaft, was fearfully crushed. He died a few hours later. Few men in the Province had such an enviable reputation among the gold-miners, both as an expert and capable mill-wright, and as a trustworthy man.

Tangier.

Boston-Tangier Mining Co.

E. Higley	Manager.
Arch. McPhail	Foreman.

Only a few men are employed.

This company took over the property and worked for a short time on the Leary and Nigger leads, in two old shafts, which they have pumped out.

In October, 1904, they commenced to sink on the Nuggety to intersect another ore-shoot supposed to exist at a greater depth, but the work was soon stopped, presumably for want of capital.

All work was stopped early in the past summer.

Oldham.

Sterling Mining Company.

John Forster	Manager.
Martin Shaughnessy	Superintendent.

40 men employed.

The main slope, or inclined shaft, which is situated on the eastern pitch of the anticlinal dome on the Sterling barrel lead, so-called, is now 820 feet deep, and slopes at an angle of from 30° down to 500 feet, to 38° at the bottom, and this appears to be gradually becoming steeper.

A cross-sectional fault which occurs near the shaft at the surface, and disturbs the strata, diverges from the shaft as it is followed down. An idea of the angle of divergence can be gathered from the fact that, at the 790-feet level, the fault is 60 feet north of the shaft.

Cross-cuts have been driven north on this fault at the 100-feet level for 170 feet, and at the 550-feet level for 75 feet.

The lead, however, on the east side of the fault has not yet been located.

The fault is filled with a crushed rock, the result of movement, and is not, as is usually the case, a soft gangue. The cross-cut has been driven in this dislocated portion.

The structure, however, is destroyed, and it is possible that the continuation of the Sterling lead has been passed. Again, it is possible, though not probable, that it lies west of the workings on the north side of the fault, the movement having possibly been in that direction.

The ore is stoped out between the shaft and this fault.

On the south side of the shaft a similar fault occurs, and also diverges from the shaft as depth is gained.

This interferes little with the workings of the company, however, as it lies chiefly across the boundary line of the property.

Levels have been driven on the south of the shaft as follows:—

At 400 feet for about 40 feet.
“ 560 “ “ 60 “
“ 660 “ “ 80 “
“ 790 “ “ 50 “

The ore has been stoped out between these levels.

Last year the production was 498 ounces from 214 tons, and during the present year this comparativley high standard has been maintained, 665 tons producing 1145½ ounces.

The profit per ton should soon be increased as a new 10-stamp mill has just been erected, and it is hoped will shortly commence crushing.

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Hardman's Property.

These workings which are situated to the eastward of the Sterling property are in a similar position with relation to the anticlinal dome.

Work was commenced in May last when the property was taken temporarily on tribute by J. Vandegrift and others.

The incline was then down about 180 feet, and it has since been sunk to a depth of 280 feet.

Like the Sterling shaft it dips at about 30° or thereabouts. An old shaft from the same deckhead was sunk several years ago slightly on the south leg. It followed a fault and reached a depth of 200 feet. The ground between there shafts has been stoped, and again as in the case of the Sterling, as depth is gained, the workable ground between the main incline and fault widens.

A boiler and hoist comprise the plant, and ore is crushed at the Frederick Taylor mill.

HANTS CO.

Renfrew.

Pictou Development Co. John Morrison has been operating here in a desultory manner since last year, but practically no more work has been done at the old mine on the Jubilee lead on the old Colonial property or on the Thompson, worked for the past few years. Work also ceased at the No. 2 shaft.

The operations for the year have consisted chiefly of surface work at several points.

Mount Uniacke.

Westlake Mining Co. J. A. Crease..................................Manager.

A few men were employed during the year, and as no ore body was encountered in the sinking this work was abandoned.

The main roll or ore shoot was followed some little distance further on its easterly pitch, but a fire at the mine having destroyed the mill, little more work was done, with the exception of keeping the mine unwatered for Mr. Rickards' examination.

J. A. Johnson's property. C. Johnson..................................Manager.

Sinking continued in the shaft to a depth of about 400 ft. and a cross-cut driven south above this depth.

South Uniacke.

Work ceased shortly after the beginning of the fiscal year and has not been resumed here.

LUNENBURG CO.

Leipsigate.

Mic-Mac Mining Co. T. W. Moore.................................... ....Manager.

Work has proceeded steadily at this mine, and the shaft has been sunk to a depth of 543 feet from surface. Levels. No. 5 and 6 have been broken off at depths of 443 feet, and 540 feet from surface.

A comparative summary statement of the driving and stoping operations, shows the progress as below :

	Depth from surface.	Distance N. E. from Shaft.		Distance S. W. from Shaft.	
		1904.	1905.	1904.	1905.
No. 1 level.	154	195	——	——	——
" 2 "	198	352	——	430	——
" 3 "	285	357	437	450	523
" 4 "	368	77	77	65	425
" 5 "	443	——	105	——	204
" 6 "	540	——	30	——	25
Shaft bottom.	545	——	——	——	——

Above level No. 3 S. W. side of slope has been extended, a short distance, and a small block has been extracted towards the shaft.

Stoping has been carried from the S. W. end of the No. 4 level up to the shaft between levels Nos. 3 and 4. On the N. E. side a block of stoping has been done above the raise from No. 4 level, and under No. 3 level. This block measures 135 feet long by 60 feet high. Stoping has been carried above the No. 5 level N. E. and S. W. from the end of the level towards the shaft, a pillar being left in each case between the stoped ground and the shaft.

A very rich pocket was encountered on the No. 5 level, about one hundred feet south west from the shaft.

It was partly with the intention of getting the extension of this body that the No. 6 level is being driven.

The mill and cyanide plant have been running during the year.

Owen Mine.

This mine is being operated by Phil. H. More. The difficulty of overcoming the water was met by the installation of a turbine pump. Work underground has resumed.

QUEENS CO.

Brookfield.

Brookfield Mining Co.

W. L. Libbey	Manager.
Stanley Cole	Foreman.

During the year none of the levels have been extended, with the exception of No. 14, which is now 366 feet west from the incline, and the ore has been stoped from the face of this level up to the level above.

This level has also been extended east of the incline 178 feet, with the hope of finding that the shoot extended in that direction. In last year's report the statement was made that the incline was 1000 feet from surface, this meant vertical distance, the measurement on the incline being over 2000 feet. No sinking has been done during the year. The ore in the east face is small, but was stoped out from near the face up to the incline. The cyanide plant has been running during the year and presumably giving satisfaction.

A. M. King has also been working in the southern part of the district and has extracted some extremely rich ore.

North Brookfield Gold Mining Co.

Noble Crowe	Manager.
Steele Crowe	Foreman.

The workings during the year have not been extended, with the exception of some stoping. Above the 234-feet level, west of the west shaft, ore has been stoped up to a height of about 100 feet on the pitch of a shoot.

Blocks of ore have also been stoped above the 310-feet level.

In all, 1,835 tons have been milled during the year.

Vogler's Cove.

Work ceased here shortly after the close of the last fiscal year.

AURIFEROUS ANTIMONY.

Dominion Antimony Company.	W. J. Prisk	Manager.
	T. Fulton	Assistant Manager.
	G. Irving, S. Aldred,	Foremen.

About 30 men employed.

Work has been brisk during the year, and the mine shows more development than for a similar period at any other stage of its career.

A total depth from the surface of 700 feet has been gained, and the size and values of the ore body appear to have been well maintained.

Moreover, the energetic efforts of Mr. McNeil looking towards improved reduction methods, have been rewarded.

Up to the present it has been the practice to cob the ore at the mine, and the high grade (an arbitrary separation) running about 45 per cent., is shipped to England in barrels, while the low grade, so called, containing good values in gold, and comprising probably about nine-tenths of the total output, remains at the mine.

The smelters, however, give only a certain percentage of the gold values, and to recover these, and save the heavy freight rates now paid, have been the objects of extensive experimenting by Messrs. Mason, Sexton, Brown and others.

These have been in the line of mechanical concentration and smelting, and cyaniding the residue after treatment to primarily eliminate the antimony contents, and then recover the gold.

Mr. MacArthur, of MacArthur & Forrest, pioneers in the cyanide treatment, has visited the mine, and, it is said, has at last perfected a satisfactory method so that the ore may *all* be treated at the mine at a minimum cost and maximum saving of both antimony and gold. An account of this and above processeswill be found in the following pages.

It is to be sincerely hoped that the results of all this experimenting will prove to be of commercial benefit.

The following is an account of the development work under ground during the year:—

No. 3 Level.—This level has been driven on the north-west side of shaft house from 110 feet to 235 feet, and a small block of ore was removed above this.

At 170 feet from shaft connection was made by sinking and raising from No. 4 level with No. 3 level.

At 20 feet below No. 3 level in this connecting winze a short drift was made east for 20 feet.

No work was done on the south-east side of shaft during the year in or above No. 4 level.

No. 4 Level.—This level has been extended north-west from 60 feet to 210 feet from shaft.

Ore has been stoped from a height of 30 feet above the level from 110 feet to 190 feet.

At 105 feet connection has been made with No. 5 level, and at 170 feet the connecting winze from No 3 level has been continued down to meet the raise workings above No. 5.

Two drifts connect these winzes.

At this point in the workings the vein appears to split and two cross-cuts have been driven northerly about 20 feet, one at the north-west end of the lower drift between the winze connections between Nos. 4 and 5, and about 40 feet north-west of the farthest connecting winze from the shaft, and the other just below this cross-cut in No. 5 level.

No. 5 Level.—No. 5 has not been driven any further north-west, but a drift from the north end of the lower cross-cut which is about 180 feet from the shaft, has been run 130 feet north-west and 30 feet south-east.

At 25 feet north-west from this cross-cut a winze is now in course of sinking, and is 60 feet below the level.

Stoping has also been carried on above this level.

No. 5 has been extended south-east from 240 feet to 290 feet from the shaft.

A large block of ore has been extracted above the level and between the shaft and the connection between Nos. 4 and 5 at 175 feet from the shaft.

At 260 feet from the shaft a winze has been sunk 180 feet.

At 95 feet below No. 5 level No. 6 level has been driven 50 feet north-west and 20 feet south-east from winze, and at 170 feet No. 7 level has been driven 155 feet north-west and 55 feet south-east from winze.

A large proportion of the vein in this lower level is composed of pure native antimony.

Stoping has been commenced above No. 7 level on the north-west side of winze.

It is proposed, in case this development work warrants it, to sink a vertical shaft further to the south-east to intersect the ore-body on its pitch in that direction.

A summary of the underground work and output is as follows :

From September 30th, 1904, to September 30th, 1905.

Raising. Lineal Feet.	Sinking. Lineal Feet.	Drifting. Lineal Feet.	Stoping. Cubic Feet.
287	217	1,071	31,375

The amount of ore produced from the mine during the year was about 4,000 tons, divided into two classes, as follows:

No. 1 Ore. Said to contain 46 per cent. s. b. and 2.56 ounces Gold per ton.		No. 2 Ore. Said to contain 8 per cent. s. b. and $10 in Gold per ton.	
Tons (2,000 lbs.)	Lbs.	Tons (2,000 lbs.)	Lbs.
429	1,224	3,570	575

527 tons, 519 pounds of mixed ore was shipped to English smelting companies, and contained (by assay) in gold 1,232 ounces, 16 pennyweights, 23 grains, valued at $24,657. Only half of this amount, however, is received at present by the operators.

An instructive article by Prof. J. F. Kemp in the "Mineral Industry" for 1892, gives an outline of the smelting process, etc. It is here reproduced in part, verbatim :—

"CHARACTERISTICS OF THE MINERAL."

The minerals containing antimony are : Stibnite (Sb. S.), Sb. 71.8 : senarmontite (Sb. O.) Sb. 83.56 : kermesite (2 Sb. S. Sb.), Sb. 75.72 ; and a variety of others of no practical value for the metal. The important ore is stibnite. Senarmontite and kermesite occur in the upper parts of veins as oxidation products. All antimony minerals readily yield the white fumes of antimony oxide before the the blow-pipe, and hence afford a copious white coat on charcoal. Stibnite almost always occurs in needle-like or bladed crystals of a steel-gray colour. The crystals are brittle, quite soft, and extremely fusible. They melt in the ordinary candle-flame. Senarmontite is white and very heavy. It frequently crystallizes in octahedra. Kermesite exhibits hair-like tufts or aggregates of a cherry-red color. In testing any antimonial mineral, the white fumes before the blow-pipe are the best indication.

METALLURGY.

The metallurgy of antimony is theoretically simple but the extreme volatility of the ores increases the difficulties. When mixed with gangue it is first purified, after hand-picking by careful liquidation, during which the sulphide drains away. This may then be fused with iron, some alkaline substance, and charcoal, so as to obtain the metal direct from the sulphide ; or the sulphide may be first roasted to the oxide, which is reduced with charcoal and some alkalide flux. The button or lump of metal obtained in the bottom of the crucible is called the regulus, and the crust of fluxes, etc., which overlies it in reducing the oxide is called the crocus.

The English process of smelting antimony ore is here condensed from a paper by Edward Rodger, in the Journal of the Society of Chemical Industry, January 30th, 1892, and the Engineering and Mining Journal, March 12th, 1892.

The ore for smelting by the English process must be free from lead and arsenic, neither of which metals can been eliminated. The ore is ground under edge runners and passed through a coarse screen, the largest pieces which are allowed to pass being about the size of hazel-nuts. After grinding, a sample is assayed to ascertain how much iron is required for reduction. The process of smelting consists in reducing the sulphide of antimony by means of metallic iron, the fusion taking place in crucibles which are heated in a very long reverberatory furnace. This furnace consists of a bed 54 feet long, including the fire-places, and 7 feet 4 inches broad (inside size), covered by a low arch which springs almost from the surface of the ground, the bed itself being sunk below the level of the ground. It is heated by a fireplace at each end, drawing into a common flue in the middle of the floor of the furnace. The sides and top of the arch are covered with one-inch cast-iron plates, the whole anchored in the usual way.

The furnace is very little above the ground level. It is, in fact, sunk into the ground, so that it is quite easy to step on to its iron-covered roof.

The crucibles are lowered into their places through circular holes, 14 inches diameter in the arch. There are 42 holes, 21 on a side. There are two 4 inch holes in the furnace roof at each end of the bed used for removing clinker.

The pair of crucibles nearest the fireplaces at each end is kept for "starring" or refining the crude metal. The charge for each crucible consists of 42 pounds of ground ore, 16 pounds of wrought-iron scrap, 4 pounds of common salt, and 1 pound of skimmings from the next operation, or else the same weight of impure slag from a previous melting. These weights vary with every ore, but the above will be true of an ore of 52% s. b.

The iron scrap used must be wrought-iron, not cast-iron. Tinned scrap is preferred, the small trace of tin being generally believed to benefit the antimony. Part of the tinned scrap is beaten up into a round ball, large enough to fit the top of the crucible loosely. Such a ball weighs about 13 pounds, and one is used for each charge, the remaining iron required being added in the form of turnings or borings, mixed through the ore, along with the salt, in the weighing scoop. The mixture of ore, salt, and iron is dropped into the crucible through an iron funnel, the lump of beaten scrap being thrown in last to form a kind of lid; the furnace hole is then closed for about half an hour when the crucible is again examined. In the meantime a fresh charge is weighed out ready for the crucible the moment it is empty. As the charge melts, the ball of iron on the top falls down and is gradually absorbed, the iron reducing the antimony to the metallic state, it being itself converted into sulphide. The salt assists the separation of the slag, and tends to promote the fusion of the silicious matters of the ore. The length of time required for fusion and decomposition varies with the position occupied by the crucible. As a rule, about four meltings are got from each crucible per 12 hours, so that, allowing for charging and occasional changing of crucibles, etc., a little less than three hours may be taken as an average; the richer the ore, the shorter the time required to melt it. Opposite to each crucible, except those used for the final refining, is placed a conical cast-iron mold, which stands close by the furnace side. It is large enough to hold the contents of the crucible and is furnished with a cast-iron lid. The crucible is balanced on the edge of the furnace wall and the contents poured into the mould, which is at once covered with the lid ; the crucible is examined, scraped out if need be, replaced, and at once re-charged.

The mold has at the bottom a circular three-quarter inch hole. The first portion which reaches the mold chills and prevents the escape of the remainder. The fused mass when cool, is knocked out by a hammer and punch. When the mass is removed, the reduced antimony is knocked away from the slag, which should be quite clean enough to be thrown away. The metal obtained is known as "singles" and contains : Antimony, 91.63 per cent; iron, 7.23 per cent; sulphur, .82 per cent; insoluble matter 0.32 per cent. An excess of iron is used to reduce the whole of the antimony in the ore, and the next operation consists in removing this by melting the "singles" with a small quantity of pure sulphide of antimony, the liquidated sulphide being used for this purpose.

The charge for the second fusion consists of 84 lbs. of singles broken small, 7 lbs. to 8 lbs. of liquidated sulphide of antimony, with 4 lbs. of salt added as a flux. Sometimes kelp salt is used in place ordinary salt in this fusion, and is found to be very suitable. The reaction in this fusion is similar to that in the last operation, the excess of iron in the metal reducing the pure sulphide of antimony to the metallic state, being itself converted into sulphide of iron. The fusion is closely watched, and great care that the metal and sulphide of antimony shall mix thoroughly ; but much stirring with iron tools should be avoided at this stage, as the object is to remove iron so far as possible. When stirring is required it is done as quickly as possible, in order to expose the iron stirrer as little as may be to the action of the sulphide of antimony. When fusion is complete, the mass is skimmed by means of a cast-iron ladle placed on a long shaft, and the metal is poured into moulds identical with those used in the previous operation. The metal resulting from this melting is known as "star bowls" and each fusion yields a lump of about 80 lbs. The skimmings go to the first operation. An analysis of this second meta showed : Antimony, 99.53% : iron 0. 18% ; sulphur 0. 16%—total 99.87%. The surface of the crystals of this metal is covered with tiny bright specks, which are a certain sign of the presence of sulphur ; this appearance is known as "flouring" metal showing these specks being said to be "floured." As in the first melting it is necessary to add an excess of iron in order to remove all the antimony, so in this case it is necessary to add an excess of sulphide of antimony in order to remove all the iron, and hence the presence of sulphur in the antimony obtained. In order to remove this sulphur, and finally to purify the metal, another melting is required ; and the custom of the trade being that antimony shall be sold in flat ingots, each "starred" or crystallized on the upper surface, it is necessary to take precautions so as to obtain this " star " or crystallized appearance, by means of which the buyer judges of the purity of the metal. These two results are achieved by melting the metal along with a peculiar flux known as " antimony flux," a body not easily prepared, and one which is often difficult to obtain at first, but, having obtained it, it is easily kept in order. The process of making this flux is a rule-of-thumb one, and is carried out something in this way : Three parts of ordinary American potash are melted in a crucible, and two parts of ground liquated sulphide of antimony mixed in. When the mixture is complete and the fusion quiet, the mass is poured out and tried on a small scale to see whether it yields a good " star " ; if it does, the ingot of metal obtained is broken, and the metal examined in order to judge whether it is free from sulphur. If free, then the flux is considered satisfactory and may be put in use ; but otherwise the flux is remelted, and more of one ingredient or the other is added as experience dictates.

The process of refining and restarring the star-bowls is as follows: The lumps of metal, when cold, are removed from the mould and thoroughly cleaned from the adhering skin of slag by chipping with sharp hammers, this part of the work being sometimes done by women, who become very expert in rapidly and completely removing every trace of slag. Unless this cleaning process is carefully carried out, it is hopeless to attempt to obtain a good star on the finished metal. The chippings are, of course, collected and returned to the second melting. The star-bowls, having been cleaned, are broken small, and a charge weighed out for refining. The charge used is eighty-four pounds of star-bowls and a sufficiency of the antimony flux. Enough flux is added to surround the ingots completely, and for this less or more is needed, according to the shape and thickness of the ingots, for ingots of the ordinary shape, about eight pounds are required. The melting takes place in the crucibles next the fireplaces—that is to say, in those which are hottest, and in which the fusion will be most rapid. The charge of metal is thrown into the crucible and narrowly watched, and whenever it begins to melt the flux is added. As soon as the fusion appears to be complete, the furnace man stirs the mixture once round only with an iron rod, and the charge is at once poured out. The ingot moulds are placed side by side, having between them a wedge-shaped frame of cast iron, called a " saddle," the edge of which points upward, and upon which the charge is poured, when the stream divides, one-half finding its way into each mould. These moulds are left to cool undisturbed, and, as they cool, the flux which covers the surface cracks, and, when cold, can be easily knocked off. The flux is used over and over again, a piece of carbonate of potash being thrown into each fusion when old flux is used. In this way it will be seen that the flux keeps on increasing as a little potash is added and a little sulphur and antimony are picked up at each fusion. The ingots must be completely surrounded by flux; there must be a thin layer of it between the mould and the metal, and also the whole surface of the ingot must be covered to the depth of a quarter of an inch. Under the circumstances, the metal should always give a good star and preserve a good color. The traces of flux which adhere are removed by washing in warm water, with the assistance of a little sharp sand, water by itself being insufficient to remove the flux, which is practically insoluble in water.

A great deal of volatilization takes place from the melted metal in the pots, and the fume thus produced is condensed in the flues of the furnace, which are built for that purpose in a winding manner, passing backward and forward under the floor of the crucible drying stoves, so as to dry the pots at the same time that the fume is condensed. The total amount of fume varies very much: the richer the ore the less fume there is in proportion to the antimony produced, although the absolute amount is greater than when a poorer ore is worked. About ten per cent. of the total antimony contained in the ore is volatilized, and of this the greater part is condensed in the flues. The fume is whitish, heavy, and rather crystalline in appearance, not very unlike white arsenic. It contains about seventy to seventy-two and a half per cent. of metallic antimony. The smelting of this fume is conducted as follows: A test experiment is made in order to ascertain the amount of carbon in the form of coke or anthracite necessary to reduce all the antimony present in the fume. This having been found, the fume is mixed by grinding under edge runners with the proper quantity of carbonaceous matter, and of the mixture so produced a few pounds' weight is added to each charge of ore and iron, when melting for singles. As the gases given off in the process are apt to cause the mixture in the pots to overflow, the "boiling ore," as the workmen term the mixture of fume and coke, is therefore looked upon by them with great disfavour; but beyond the mechanical difficulties, there is no trouble whatever in smelting the fume. The flues require cleaning out at intervals, sometimes once every two or three months.

The ingots, which are known in the trade as "French metal," after being wrapped in straw, are packed in kegs holding about 6 cwt. net.

Cakes or ingots of antimony (regulus) are crystalline and brittle. They exhibit rude outlines of crystals which suggests ferns and stars; hence the metal itself is called "star antimony." The value of any sample of antimony is judged, not by analysis, but by its appearance, and a good sample of metal should exhibit the following characteristics: The star should be bold and defined, standing well upon the metal, the edges of the ridges sharp and straight; the metal itself should be lustrous and white, not dull and leaden-looking. Lastly, on breaking the ingots, the crystals should be large and their surfaces free from specks, which are a sign of sulphur in the metal, a most undesirable impurity. On this last point, perhaps more than any other, depends the value placed upon the sample under consideration.

The principal impurities are lead, arsenic, iron and sulphur. In alloys containing lead and antimony, however, lead may not be so objectionable, the disadvantage being that chemical analysis is needed to indicate the proportions to be used.

USES.—Antimony is most largely employed in the form of alloys with other metals. To soft metal like lead it gives stiffness and hardness, as in type-metal, britannia-metal, etc. It likewise is used in babbitt-metal for bearings and for many similar uses. In copper, however, it is one of the most deleterious and dreaded of impurities. The native sulphide has been found useful in vulcanizing rubber. Much antimony in the shape of alloys reaches the market as a by-product in the metallurgy of base bullion. Some silver-lead mines of which the Horn Silver at Frisco, Utah, is an example, furnish a very hard grade of silver-lead, and when this is skimmed in the softening process, preliminary to zinc-desilverization, the skimmings contain zinc, antimony, arsenic, copper, etc., and are often sold direct for alloys.

The above description does not speak of mechanical dressing as a substitute for the wasteful liquation process. Although frequently proposed, such a method does not seem to have been adopted anywhere in practice.

Recently, however, through the energy of Mr. Alex. McNeil, of the Dominion Antimony Co., of West Gore, Hants Co., experiments in this and other reduction tests were conducted by Mr. E. Percy, Brown, B. Sc., at Bridgewater, N. S.

The results are given below in his own report :—

REPORT OF WORK DONE ON LOW GRADE ORE FROM THE PROPERTY OF THE DOMINION ANTIMONY CO., LTD.

A. Wet concentration.

1. Lot of about 3 tons crushed and concentrated as follows :—

(a) Rock breaker to ¾ inch (dry.)
(b) Rolls to ¼ inch (dry)
(c) Roller mill to 20 mesh (wet.)
(d) Classifier (separating coarse and fine.)
(e) Wilfley table for coarse material.
(f) Two belt tables for fines.

It was first expected that the rolls would crush directly to a product that could be concentrated (20 or 30 mesh) ; but this was found impossible so the above was tried. The results were most unsatisfactory, and it was found that while the antimony was ground to an almost impalpable powder by the roller mill, that the sand escaped this grinding and passed out through the screen comparatively coarse.

Most of the antimony was carried off in the water as slimes and was lost. Not more than 10% of the total antimony in the ore was saved by this method.

The above test shows that it is impossible to concentrate the ore after grinding it in contact with water.

A stamp battery would work in a similar way.

2. A trial crushing of 3¼ tons (6500 lbs.) assaying about $5.00 in gold, and 5 to 6 per cent. antimony through a 16 mesh screen gave 800 lbs. concentrates assaying 35% antimony. Therefore a saving of 86% of the total antimony.

3. The above test was repeated on 5 tons of the ore, using as before a 16 mesh screen.

The procedure was as follows :—

- (a) Rock breaker to ¾ inch.
- (b) Rolls to ¼ inch.
- (c) Dry sizing on 16 mesh screen.
- (d) Repassing over size through rolls until all passed through screen.

RESULTS.

	Gold.	Antimony	Weight.	Total Gold.	Total Antim'y.
Ore,	$ 4.00 per ton	6%	5 tons	$ 20 00	500 lbs.
Concentrates,	10.00 " "	30%	1437 lbs.	7 18	431 " (86%)
Sand,	3.00 " "	1%	8363 "	12 54	83 "
Slimes.	6.00 " "	3%	200 "	60	6 "

It can be seen that the concentrates from this test were very low grade, both in gold and antimony. It was found impossible to clean them further when crushing to this size without considerable loss of antimony. Otherwise the ore concentrated splendidly, and as can be seen from the above figures, the loss from sliming was very low.

4. 6¼ tons of ore were crushed with the rolls through a 24 mesh screen, repassing as before, with the following results :—

	Gold.	Antimony.	Weight.	Total Gold.	Total Antim'y.
Ore,	$ 7.00 per ton	6.2%	6¼ tons	$ 43 75	775 lbs.
Concentrates	24.00 " "	50.5	1400 lbs	16 80	700 " 90%.
Sand,	4.00 " "	1.0	10665 "	21 34	100 "
Slimes.	18.00 " "	5.0	444 "	3 99	20 "

The most noticeable feature of this test was the complete separation of the ore on the Wilfley table into slimes, sand middlings (returned on the table to be retreated), and concentrates. This last being divided into two products, stibnite and metallic antimony.

The slimes can readily be kept separate from the sand, and as is seen from the above result the sand is comparatively free from antimony, and will probably yield its gold to Bromo-Cyanide, though it will likely have to be reground before this treatment.

The treatment of the slimes presents a more difficult problem, but in actual practice their amount wonld probably be small.

B. Smelting of the concentrates obtained in wet concentration.

List No. 4.

1. Concentrates—25 lbs.
Carbonate Soda—25 lbs.
Scrap Iron—5½ lbs.

This gave a bar of antimony weighing 11¾ lbs., and containing considerable iron. The slag was pasty and it was evident that there was not sufficient soda.

2. Concentrates—25 lbs.
Carbonate Soda—37 lbs.
Scrap Iron—5½ lbs.

The antimony recovered weighed 13 lbs., and the slag was more fluid than in No. 1, but the antimony still contained iron. After the above tests the graphite crucibles were very badly corroded. This action was supposed to be due to the water contained in the carbonate of soda, and this action together with the large quantity of the flux necessary made it seem probable that soda bicarbonate would be better.

Therefore, the following tests were made :—

3. Concentrates—25 lbs.
Bi-Carb. Soda—25 lbs.
Iron—4 lbs.

Gave a bar of antimony weighing 12 lbs., and showing very little iron. The crucible was still attacked.

5. The following charge was smelted in a clay crucible and gave a very fluid slag, and a bar of good antimony weighing 2½ lbs.

Concentrates—5 lbs.
Bi-Carb Soda—5 lbs.
Scrap Iron—4 lbs.

The crucible in this case was not attacked. It seems probable that the soda could be considerably reduced.

Refining of the crude antimony was tried in 10 or more different charges but with poor success.

C. Bromo-Cyanide treatment of the sand from wet concentration test No. 4.

1. 4 A. T. (120 gms.) of ore through 24 mesh were agitated in closed vessel for 24 hours ; strength of cyanide solution—2/10%.

Extraction— 30%.

2. 4 A. T. (120 gms) of ore ground through 100 mesh agitated in closed vessel for 24 hours ; strength of cyanide—2/10%.

Extraction--50%.

There is no doubt that by altering the details of this treatment that the extraction can be increased.

D. Mr. Maze leached about 300 lbs. of concentrates from wet concentration test No. 2 with a strong solution of sodium sulphide, and afterwards attempted to deposit the antimony from the solution by electricity. Some antimony was deposited but the test was not completed.

CONCLUSIONS. From the above work it appears that the wet concentration after dry crushing, and careful sizing on a screen of 24 to 30 mesh can be successfully carried out. By careful work concentrates carrying from 20% to 60% antimony can be obtained with a small loss by sliming, and a sand which is sufficient free from antimony to probably admit of successful cyanide treatment.

The smelting of the concentrates is difficult to carry out on a larger scale, though easy in the laboratory with small charges. If at all possible it would pay to ship these with the high grade ore.

As I was anxious to conclude the work at the mill and so stop that expense, I was unable to complete the Bromo-Cyanide test.

The leaching of the ore by sodium sulphide is probably too complicated to be practicable on a commercial scale.

As to the electrical separation of the gold from the metallic antimony obtained by smelting, I am not able to give an opinion ; but it is evident if studied at all it should be done in well equipped electrical works and by persons well up in this department of electricity.

E. PERCY BROWN.

BRIDGEWATER, July 25th, 1905.

Although not unique, the occurrences of auriferous antimony in quantities sufficient to pay well are rare, and so little appears to be locally known of the antimony industry, and so little has been written on the progress in its metallurgy, that a few notes gathered from the sparsely-available literature and other sources may be of interest and assistance.

The world's production of ore, by countries, from 1880 to the present time, is as follows, the values being given where obtainable:

Year.	Austria.		Borneo (b)		France and Algeria.		Hungary.		Italy.		Japan.		Mexico (b)	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1893..........	441	$24339	....	....	7250	$134809	881	$ 32160	1193	$ 40402	1525	....	9	$ 300
1894..........	686	32943	599	$ 57320	6319	86231	1293	33648	1504	45059	1170	....	80	2836
1895..........	695	26688	657	64100	5703	75367	1233	31680	2241	40254	1045	....	600	14281
1896..........	905	38702	(c)	(c)	6333	81509	861	14739	5086	60590	827	....	3231	32093
1897..........	864	38255	(c)	(c)	5466	83538	1361	26736	2150	27657	(c)	....	5873	71835
			Boli	via.										
1898..........	679	22867	591	221725	4571	69462	2201	20219	1931	43822	1006	....	5932	98815
1899..........	410	15244	1213	454866	7592	130493	1965	34205	3791	44862	712	....	10382	115292
1900..........	201	7065	1174	440775	7936	115978	2373	37720	7609	72468	81	....	2313	23319
1901..........	126	4557	190	38309	9867	156834	1691	19500	8818	68513	(e)	....	5103	51064

Year.	New South Wales.		New Zealand.		Portugal.		Queensland.		Spain.		Turkey.		United States.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1893..........	1802	$125460	336	$17335	666	$ 51789	30	$ 1440	88	$ 2784	1035	....	771	$ 41000
1894..........	1270	93720	45	3805	803	47698	28	1400	15	300	1545	....	150	9075
1895..........	486	36255	55	7430	753	33889	(c)	(c)	44	700	Nil	....	982	37905
1896..........	135	9170	21	2250	595	26755	(c)	(c)	54	1385	100	....	136	4750
1897..........	172	18060	10	763	417	28063	(c)	(c)	354	6483	400	....	454	16000
1898..........	84	4580	Nil	....	245	6736	Nil	....	130	2149	(g)	....	(g)	....
1899..........	332	13470	Nil	....	59	2123	41	1000	50	1560	1173	....	544	20000
1900..........	252	12145	5	505	38	554	Nil	....	30	900	267	....	300	10500
1901..........	90	5915	30	680b	126	2650	Nil	....	10	150	(e)	....	100	3500

Year.	Austria.	Canada.	France.	Hungary. (a)	Italy.	Japan.	Macedonia.	N. S. Wales. (b)	Zealand.	Queensland.	Spain.	United States.	Victoria.
1880	202	41	1781	583	540	....	....	....	61	....	11	....	....
1881	187	34	2089	767	600	394	....	....	2	361	14	....	....
1882	509	328	1359	734	1450	2504	....	....	30	255	30	....	....
1883	495	168	1059	613	2027	2407	....	382	31	535	45	....	....
1884	306	491	658	490	1714	1492	....	441	....	760	1095	....	192
1885	180	770	536	687	2887	2686	....	298	677	71	150	....	....
1886	393	675	247	191	1738	2416	....	277	63	112	8	....	....
1887	391	584	341	238	848	1566	....	171	136	....	322	....	....
1888	353	345	789	198	507	1484	....	193	382	....	440	....	....
1889	343	55	2229	174	563	1944	....	225	501	59	456	240	46
1890	770	27	4962	224	891	3224	....	1403	523	175	821	327	132
1891	333	10	5316	....	782	2286c	210	930	421	220	690	635	67
1892	97	....	5000e	853	621	2500e	425	740	370	26	600e	744	299

An alleged hindrance to amalgamation, caused by the presence of antimony with the gold, is referred to by T. Egleston, Ph. D., School of Mines, New York, in a short but interesting paper in the Trans-Am. Inst., M. E., Vol. IX, pages 648 and 649.

A process devised by Mr. F. H. Mason, and experimented on by Prof. Sexton, of Dalhousie College, is given below, together with the conclusions reached in the latter's work.

The concentrates or pulverized ore are first intimately mixed with about 20% of its weight of powdered charcoal, coke, coal (preferably non-coking), iron pyrites, or other reducing agent, hereinafter called the reducing agent, the quantity of reducing agent varying with the nature of the concentrate ore and of the reducing agent employed.

The charge of ore or concentrate and reducing agent, hereinafter called the charge, is placed in a furnace and roasted at a low temperature in an oxidizing atmosphere, the charge being continually stirred either by hand or mechanically. When most of the sulphur has become oxidized and volatalized, the temperature is gradually raised to a dull red heat, at which heat it is maintained until fumes almost cease to come off from the charge. More reducing agent is now added and stirred intimately into the charge and the roasting continues. Stirring being less vigorous and less oxygen admitted to the charge. As the fumes begin to stop coming off more reducing agent is added, and the operation continued as before. Reducing agent is added in this way until such time as the charge ceases to give off fumes after the addition of the reducing agent, and does not become "sticky" if allowed a rest from stirring. The temperature of the furnace is now brought to a bright red heat and maintained at that heat for a time, and then withdrawn.

If it be preferred, instead of adding solid reducing agents to the charge after the sulphur has been roasted off, the atmosphere of the furnace may be made alternately oxidizing and reducing by leading or forcing into the furnace reducing gases at intervals.

The fumes arising from the roasting operation are drawn through a series of chambers similar to those used in the manufacture of white arsenic, when the greater part of the antimony is deposited principally in the form of trioxide, together with any arsenic that may be contained in the ore or concentrate.

Nearly the whole of the gold remains in the non-volatile residue, from which it may be extracted by smelting the residue with suitable collecting agents, such as lead or copper ores, or refuse, or by other known metallurgical processes.

Claim.—I claim for this process that nearly the whole of the antimony in an ore or concentrate may be separated from the gold contained in the same by subjecting the ore or concentrate to a series of alternate oxidizing and reducing reactions in a furnace, either by the addition of a solid reducing agent, or by continually altering the atmosphere of the furnace, after the greater portion of the sulphur has been oxidized, from an oxidizing atmosphere to a reducing atmosphere by leading or forcing into the furnace at intervals reducing gases.

I further claim that not less than eighty per cent. of the antimony contents of the ore or concentrate can be recovered in the condensing chambers (the average recovery of arsenic being 85 per cent.) similar to those used for the condensation of arsenic fume, and that unit for unit, the antimony contained in the oxide collected from the chambers will be of greater commercial value than it was in the original ore or concentrate before treatment. I further claim that nearly the whole of the gold contained in the ore or concentrate will be retained in the non-volatile residue of the operation, and that ninety per cent. of the gold originally contained in the ore or concentrate may be recovered from the non-volatile residue by known metallurgical processes, my laboratory experiments having shown as high as ninety-eight per cent. recovery.

With regard to cost, a concentrate similar to that with which I have been experimenting, containing about twenty per cent. gangue, thirty-nine per cent. antimony, and five millogrammes of gold per one hundred grammes, requires, in the laboratory, fifty per cent. of its weight of coke or anthracite coal as a reducing agent to volatilize nearly the whole of the antimony. In a properly-constructed furnace, where the supply of oxygen could be readily cut off at will, this should be reduced fifty per cent. With regard to the cost of fuel and labour, this should be about the same as in roasting arsenical ores, (see *Mineral Industry*, 1893, page 28,) where the cost is given as two shillings per ton for labour, and the maximum fuel as two hundred-weight of coke per ton. To be safe, say eight hundred-weight of coke for fuel and reducing agent combined, and one dollar for labour, fifty per cent. more than for the arsenic roasting. Thus we get:

8 cwt. coke, at $4.00 per ton	$ 1 60
Labour, cleaning chambers, say $1.00 per ton of fume collected	1 00
39 per cent. of antimony gives 46.8 per cent. of trioxide, 80 per cent. this equal ·375 tons	38
Cost of roasting	$ 2 98

With regard to the cost of smelting the principal smelting companies will buy this material (the residue) detaining the whole of the gold and charging not more than $10.00 per ton for treatment. They naturally have to make a profit, and it is I think fair to assume that the ore could be smelted on the spot at the same price.

I find that 56 per cent. of the concentrate is volatile, therefore only 44 per cent. has to be heated, thus the cost of smelting the residue from one ton of concentrates would be $4.40.

Owing I believe to the fact that the concentrates contain a small percentage of lead which in roasting forms oxide and sinters the residue, chlormation and cyanide of the residue have only given up to 80 per cent. extraction up to date.

It should be mentioned that had the concentrates only contained 10 per cent. of gangue, which is all a good concentrate should contain, it would reduce the residue to be smelted by more than 25 percent.

F. H. Mason.

The following letter received by Mr. Mason from the American Smelting and Refining Co., of New York, refers to a sample of the residue remaining after his roasting treatment :

New York, Jan. 1 th, 1905.

Mr. F. H. Mason, F. C. S.,
Queen Building, Hollis Street,
Halifax, N. S.

Dear Sir :—Referring to the sample of your ore which you were kind enough to furnish us recently, and of which we note you have several hundred tons ready for shipment, I beg to advise that our assay of the sample showed gold contents of 2.76 ounces per ton, with 5½ per cent. lead, wet assay. We should be glad to receive the quantity which you may have ready for shipment of ore of this character, delivered f. o. b. our works at Perth Amboy, N. J., making settlement for same upon the following basis :

Gold : Pay for entire contents at $20.00 per ounce.

Lead : Pay for 90% of contents by dry assay (wet assay less 2 units) at 4½ cents per pound.

Working Charge : $6.00 per two thousand pounds of ore delivered alongside our dock, or f. o. b. cars in our yard at Perth Amboy, N. J.

As you are no doubt aware, there would be a small import duty to be paid on the material, due to its containing a little lead. The tariff rate is 1½ cents per pound of lead contained. This duty would be for your account.

If shipment is made by rail, same should be consigned to the American Smelting and Refining Co., Perth Amboy, N. J., care of Lehigh Valley R. R., with freight prepaid through to destination.

Kindly advise whether you decide to make the shipment on the above terms, obliging,

Yours very truly,
W. E. MERRISS,
Assistant Secretary.

After conducting a series of experiments on Mr. Mason's process Prof. Sexton says :—

CONCLUSIONS. It appears from the above experiments that the gold in a raw antimony ore, or in concentrates, is not volatilized to any considerable degree with the antimony trioxide that passes off as fumes, and that 90 per cent. or more of the gold that is in such raw ore, or concentrates is contained in the residue after roasting.

It also appears that 80 per cent. or more of the antimony contained in the raw ore or concentrates is volatilized as the trioxide. When the antimony ore or concentrates is roasted in a regular reverberatory furnace, this antimony trioxide would be caught to a great extent in properly constructed condensing chambers.

Mr. F. H. Mason claims " that nearly the whole of the antimony in an ore or concentrate may be separated from the gold by subjecting the ore or concentrate to a series of alternate oxidizing and reducing reactions in a furnace," whereby " not less than 80 per cent. of the antimony contents of the ore or concentrate may be recovered in condensing chambers,—and that nearly the whole of the gold contained in the ore or concentrate will be retained in the non-volatile residues," from which " 90 per cent. of the gold originally contained in the ore or concentrate may be recovered from the non-volatile residue by known metallurgical processes."

My opinion is that these claims are substantiated as far as a few small laboratory tests can prove anything. The experiments undoubtedly point to a very valuable line of investigation. It must be remembered however that laboratory experiments are simply indications, and do not accurately fortell what may be expected in actual practice.

Mr. Mason's claim that the value of the product collected in the condensing chambers is of greater commercial value than before treatment, is a trifle misleading. It is true that antimony trioxide is quoted at fourteen to sixteen cents a pound, but it must be of exceptional purity and whiteness, and has at that a very limited market. The antimony trioxide caught from the first roasting of the ore would have to be very carefully purified one or more times. It is true that it is of greater value than it was in the original ore, because it is an intermediary product in a regular process for the extraction of metallic antimony. If this crude antimony trioxide is mixed with carbon and proper fluxes, the metallic antimony may be obtained from it.

Mr. Mason evidently leans more to smelting than to other metallurgical processes for the extraction of the gold from the roasted product. It seems to me that such a product would be amenable to amalgamation and subsequent cyaniding, direct cyaniding, or chlorination. Take, for example, the ore in the first test, Mr. Mason's own. It contains 2.24 ounces per ton, or, with gold at, say, $20 per ounce, $44.80 per ton. If this were to be smelted, it would probably be sent to New York, where it would be done for $10 per ton. This would leave $34.80 per ton profit, out of which the freight to New York must be paid. Mr. Mason says that he has obtained eighty per cent. extraction by cyaniding. This would give $35.84 per ton extraction, leaving one dollar per ton for the cost of cyaniding, in addition to the freight charges, which would, of course, be saved. Roughly speaking, I would set $1.50 per ton as the outside cost of cyaniding this residue. Besides this there is an added value in carrying out the whole process upon the ground. Mr. Mason has not carried out the cyaniding treatment to any great extent, and it is extremely probable that a higher extraction could be obtained. If the roasted residue is to be smelted it is very desirable that the ore should be first concentrated so that the residue should be as small as possible, but the purer the ore, the greater the difficulty in roasting and the more imperfect the elimination of the antimony from the residue with the consequent greater cost of smelting for every added unit of antimony in the residue.

Finally, I would recommend further experimentation on a larger scale to determine the percentage of gold that may be retained in the roasted residue and also as to the application of the cyanide or chlorination process to the roasted residue, before recourse is taken to smelting.

Later experiments embodied in the following report by Prof. Sexton, though rather unsatisfactory in results, are highly instructive :

To the Dominion Antimony Co., Ltd.

At the request of Mr. Alex McNeil, I have carried out a number of experiments upon your antimony-gold ore in the Mining and Metallurgical Laboratory of Dalhousie College, and beg to submit the following report.

The first thing done was to prove by as large scale tests as possible, the fundamental principle in the process for the extraction of gold and silver from this ore, evolved by Mr. F. H. Mason. It will be remembered that Mr. Mason claims that in the ordinary oxidizing roast of an antimony-gold ore, the antimony is, for the most part, eliminated as fume, while the gold remains behind in the residue. Tests were made in a small reverberatory roasting furnace, which has a hearth about 3′ x 4′ in size, and resembles in construction the reverberatory furnace used in smelting plants for the roasting of sulphide ores. The fuel used is run of mine soft coal, but the hearth is so small in comparison with the grate area, that the amount of coal used is no indication of the amount of coal required in practice per ton of ore roasted. From 50 to 60 lbs. of ore were roasted at a time. Most of the ore had been screened through a 6 mesh screen. The roasts were as follows :—

ROAST No. 1.

High grade ore { 45.55 per cent. antimony.
2.82 ounces gold.

The ore was mixed with three-fourths of its weight of ground anthracite coal, and put into the red hot furnace. Great care had to be exercised to prevent the ore from running together. It was stirred vigorously for five or six hours. The fumes were evolved copiously and continuously. The roast lasted sixteen hours, and at the end some fumes were still evolving. The roasted residue weighed fifty-eight per cent. of the original ore charged, showing that nearly half the ore had been driven off as fume.

Roasted residue { 1.82 per cent antimony.
4.48 ounces gold.

Calculation shows that practically all the gold remains in the residue.

Percentage of antimony eliminated, 73.37 per cent.

The roasted residue was leached with cyanide solution, as follows :

TEST No. 1.

Ore ground through 30 mesh, (4 kilos).

Cyanide solution, 0.5 per cent.

Time of percolation, 24 hours.

Extraction with plain cyanide, 38 per cent.

Extraction with bromo-cyanide, 42 per cent.

ROAST No. 2.

Ore No. 2 { 20.32 per cent. antimony.
1.2 ounces gold.

This roast was carried out without adding any fine coal to the ore in the furnace. Fumes were evolved for only four hours and the roasted product contained about 7 per cent. of antimony. All of the gold remained in the roasted residue. The roasted residue was treated with cyanide as follows:—

TEST No. 2.

4 kilos of ore ground through 30 mesh.

Time of percolation, 72 hours.

Percolated with 0.5 per cent. solution for 48 hours, then changed to 0.2 per cent. solution, and percolated for 24 hours.

Extraction, 46.3 per cent.

The tailings from the cyanide solution were put into a bottle and rotated as a thin pulp with $\frac{1}{4}$ pound of mercury for eight hours.

Extraction by amalgamation, 59.7 per cent.

Total extraction, by cyanide and amalgamation,—78.2 per cent.

TEST No. 3.

Amalgamation test on residue from roast No. 2, without previous or subsequent cyanidation.

$1\frac{1}{2}$ pounds ore ground through 60 mesh was mixed with water into a thin pulp and rotated in a bottle with a quarter pound mercury for eight hours.

Extraction by amalgamation, 57 per cent.

ROAST No. 3.

$$\text{Ore No. 2.}\begin{cases}\text{20.32 per cent. antimony.}\\ \text{1.2 ounces gold.}\end{cases}$$

25 kilos of raw ore were roasted for ten hours, and during the latter part of the roast, 10 per cent. of fine coal was added. The roasted product weighed 19.5 kilos, and carried 2.3 ounces of gold, showing that all the gold is retained in the roasted residue.

TEST No. 4.

The whole of the residue from roast No. 3 was ground through 20 mesh and charged into a gold clean-up barrel. Enough water was added to make a thin pulp, iron tumblers inserted to grind the ore, and 2 lbs. of mercury added. The whole was rotated for eight hours. It was found that the ore had been ground very fine and a good deal of amalgam floured, so that it could be made to coalesce only by the addition of sodium amalgam. The percentage extracted by amalgamation, 55 per cent.

The tailings of the amalgamating run were treated with cyanide solution as follows :—

About one lb. of the tailings was mixed in a bottle with three lbs. of 0.5 per cent. solution of cyanide. The test was stopped, the ore allowed to settle and the solution decanted every three hours, and fresh solution added. After ten hours, the solution was changed from 0.5 to 0.2 per cent. Tailings were finally washed by decantation. Total time of contact of ore with cyanide solution, 24 hours.

Extraction, 38 per cent.

NOTE :—The tailings from the amalgamation test were so fine, that they could not be leached, so were treated as slimes.

ROAST NO. 4.

$$\text{Ore No. 2}\begin{cases}\text{20 32 per cent. antimony.}\\ \text{1.02 ounces gold.}\end{cases}$$

Twenty-five kilos of raw ore, through six mesh, were charged into a hot furnace, and began roasting almost immediately. The fumes came off copiously for two hours. If the ore is stirred well, there seems to be no great danger of sintering. Lumps that form are very easily broken up by the rabble iron. After two hours, fine coal has to be added, and the ore heaped on the hearth between the times of rabbling in order to volatilize the antimony. Thr roast lasted six and a half hours, but fumes could be evolved at the end by mixing carbon with the ore. In the roast, the ore lost sixteen per cent. of its weight, and six per cent. of coal was added to the ore on the hearth.

$$\text{Roasted res due}\begin{cases}\text{5.35 per cent. antimony.}\\ \text{1.02 ounces (\$33.90) gold per ton.}\end{cases}$$

Per cent. of antimony eliminated, 73.7.

All of the gold remained in the roasted residue.

On this roasted residue, a series of combined amalgamation and cyanide tests were run. The amalgamating machine was a small model twelve-inch amalgamating pan, specially designed for use in the Mining Laboratory of the Massachusetts Institute of Technology, and kindly loaned by them for this purpose. Usually the test was carried out as follows :—

The roasted residue, in the same condition as it came from the furnace, was charged into the pan, with the muller set hard against the bottom. Water was added, and the ore, which has been rendered friable and easy to crush by exposure to the heat of the roast, was ground to a fine pulp in a certain definite length of time. The pulp was kept at a certain consistency, so that the mercury, which was added after the grinding, would just show on the top. After grinding, the muller was raised one-eighth of an inch, and rotated for varying lengths of time. After the amalgamation was considered to be sufficient, the contents of the pan were mixed with water, in a gold pan, and the mercury separated from the ore by panning. These tails were dried, sampled, and assayed. The tails were then tested by percolation with cyanide solution. For a cyanide testing vat, an ordinary wooden pail was fitted with a canvas filter supported on a wooden frame about two inches from the bottom. The ore was placed on the filter, and percolated in the ordinary way. Most of the tails from the amalgamation test that were ground in the pan contained such a large quantity of slimes that they did not percolate freely. The cyanide tails were dried, sampled, and assayed, and in one or two cases, these tails were agitated with cyanide solution in a bottle to see if further values could be extracted.

TEST NO. 5.

A. AMALGAMATION TEST.

2 kilos of ore ground 2 hours.

Amalgamated 4 hours, with 1-5 pound mercury.

Original ore assay, 1.64 ounces (33.90) per ton.

Tails assay, 1.28 ounces (26.44) per ton.

Extraction, 21.9 per cent.

B. CYANIDE TEST.

Strength of solution, 0.3 per cent.

Weight of ore, 1.86 kilos.

Time of percolation, 96 hours.

Heads assay, 1.28 ounces ($26.44) per ton.

Tails assay, 0.60 ounces ($12.41) per ton.

Extraction, 53.12 per cent.

Total extraction, 63.41 per cent.

TEST NO. 6.

A. AMALGAMATION TEST.

2 kilos ground 2 hours.

Amalgamated 6 hours with 1-5 pounds mercury.

Original ore assay, 1.64 ounces ($33.90) per ton.

Tails assay, 1.49 ounces ($30.81) per ton.

Extraction, 9.14 per cent.

B. CYANIDE TEST.

Strength of solution, 0 3 per cent.

Weight of ore, 1.72 kilos.

Time of percolation, 96 hours.

Heads assay, 1.49 ounces ($30.81) per ton.

Tails assay, 0.74 ounces ($15.26) per ton.

Extraction, 50.34 per cent.

Total extraction, 54.88 per cent.

TEST No. 7.

A. AMALGAMATION TEST.

2 kilos of ore ground 2 hours.

Amalgamated 8 hours with 1-5 pounds mercury.

Original ore assay, 1.64 ounces ($33.90) per ton.

Tails assay, 1.62 ounces ($33.49) per ton.

Extraction, 1.21 per cent.

B. CYANIDE TEST.

Strength of solution, 0.3 per cent.

Weight of ore, 1.90 kilos.

Time of percolation, 96 hours.

Heads assay, 1.62 ounces ($33.49) per ton.

Tails assay, 0.80 ounces (16.54) per ton.

Extraction, 50.61 per cent.

Total Extraction, 51.22 per cent.

TEST No. 8.

A. AMALGAMATION TEST.

2 kilos of ore ground two hours.

Amalgamated eight hours with 1/5 lb. mercury :

Original ore assay, 1.64 ounces ($44.90) per ton.

Tails assay, 1.22 ounces (25.2 per ton.

Extraction, 23.60 per cent.

B. CYANIDE TEST.

Strength of solution, 0.3 per cent.

Weight of ore, 1.79 kilos.

Time of percolation, 96 hours.

Heads assay, 1.22 ounces ($25.22) per ton.

Tails assay, 0.84 ounces (17.37) per ton.

Extraction, 31.15 per cent.

Total extraction,

C. CYANIDE AGITATION TEST.

Strength of solution, 0.3 per cent.

Weight of ore, 1.7 kilos.

Time of contact, 6 hours.

Heads assay, 0.84 ounces ($17.37) per ton.

Tails assay, 0.65 ounces (13.44) per ton.

Extraction, 22.80 per cent.

Total extraction, 60.36 per cent.

TEST NO. 9.

Since the preceding tests were made, with a view to extracting the gold by amalgamation, with the cyanidation a secondary factor, it was determined to reverse the order of things, and make cyanidation the prime factor. The fineness of the tails from amalgamation prevented rapid percolation. It was also thought that a perliminary wash of potassium cyanide, K. C. N., might take the film off the grains of gold so that they would amalgamate better. In view of this, 2-1/2 kilos of the roasted residue, such as that had been used in the previous tests, was ground through a 40 mesh screen, and the undersize removed repeatedly to prevent any unnecessary amount of slimes. This product was placed in an amalgamating pan with mercury and amalgamated without any grinding. It was very difficult to get a satisfactory pulp current in the pan with this coarse material.

A. AMALGAMATION TEST.

Weight of ore, 2-1/2 kilos through 40 mesh.

Amalgamated six hours with 1/5 lb. mercury.

Original ore assay, 1.64 ounces ($33.90) per ton.

Tails assay, 1.12 ounces (23.15) per ton.

Extraction, 31.71 per cent.

B. CYANIDE TEST.

Strength of solution, 0.3 per cent.

Weight of ore 2.125 kilos.

Time of percolation, 96 hours.

Heads assay, 1.12 ounces ($23.15) per ton.

Tails assay, 0.79 ($16.33 per ton.

Extraction, 29.47 per cent.

C. CYANIDE AGITATION TEST.

Strength of solution, 0.25 per cent.

Weight of ore, 1 kilo.

Time of contact, 6 hours.

Heads assay, 0.79 ounces ($16.33) per ton

Tails assay, 0 78 ounces ($16. 09) per ton.

Extraction, 1.26 per cent.

Total extraction, 52.44 per cent.

Test No. 10.

In this test the ore was ground through 40 mesh as in the previous test, but instead of putting a wash of potassium cyanide before amalgamation, the ore was allowed to stand in contact with a 2 per cent. solution of caustic soda over night and the ore completely washed by decantation in the morning.

A. AMALGAMATION TEST.

Weight of ore, 2.2 kilos through 40 mesh.

Amalgamated six hours with 1/5 lb. mercury.

Original ore assay, 1.64 ounces ($33.90) per ton.

Tails assay, 1.26 ounces (26.05) per ton.

Extraction, 23.15 per cent.

B. CYANIDE TEST.

Strength of solution, 0.25 per cent.

Time of percolation, 96 hours.

Weight of ore, 1.86 kilos.

Heads assay, 1.26 ounces ($26.05) per ton.

Tails assay, 0.96 ounces (19.85) per ton.

Extraction, 23.81 per cent.

Total extraction, 41.45 per cent.

TEST NO. 11.

In this run no preliminary wash of potassium cyanide or caustic soda was used. The ore was ground through 40 mesh as in the two preceding tests. Pulp current in amalgamation was very unsatisfactory.

A. AMALGAMATION TEST.

Weight of ore, 2 kilos through 40 mesh.

Amalgamated four hours with 1/5 lb. mercury.

Original ore assay, 1.64 ounces ($33.90) per ton.

Tails assay, 1.63 ounces (33.70) per ton.

Extraction, 1 per cent.

B. CYANIDE TEST.

Strength of solution, 0.25 per cent.

Time of percolation, 72 hours.

Weight of ore, 1.77 kilos.

Heads assay, 1.63 ounces ($33.70) per ton.

Tails assay, 0.62 ounces. ($12.81) per ton.

Extraction, 61.96 per cent.

Total extraction, 62.19 per cent.

All the subsequent tests were made upon the No. 3 ore, the low grade ore produced at the mine. An assay of this ore showed 0.36 ounces ($7.44) per ton of gold, and 5.99 per cent. antimony. The sample of ore consisted of a barrel, containing a net weight of 480 pounds.

ROAST NO. 5.

Ore No. 3 { 5.99 per cent. antimony.
0.36 ounces ($7.44 per ton gold.)

The ore was crushed to pass a quarter-inch screen (4 mesh). In crushing, the ore tends to break in scales, and is very soft, so that it produces a large amount of slimes. Thirty kilos were charged into a hot furnace, and the fumes began to come off almost immediately. It was roasted in a restricted amount of air, and fumes came off steadily for *one hour*. Then the fumes ceased almost entirely. The ore acted very sandy in the furnace. Even when fine coal was mixed with the ore, it was very difficult to evolve more fumes. The roasted residue was sampled, and assayed as follows:

Roasted residue { 1.23 per cent. antimony.
0.40 ounces ($8.27) per ton gold.

79.4 per cent. of the antimony was eliminated.

All the gold remained in the roasted residue.

TEST NO. 12.

A sample of the *raw* ore, No. 3, weighing 5.0 kilos, was ground through 40 mesh, repeatedly sieving out the undersize to prevent an unnecessary amount of slimes. This was cyanided as follows:—

CYANIDE TEST.

Strength of solution, 0.25 per cent.

Time of percolation, 96 hours.

Weight of ore, 5.0 kilos through 40 mesh.

Heads assay, 0.36 ounces ($7.44) per ton.

Tails assay, 0.29 ounces ($6.00) per ton.

Extraction, 19.44 per cent.

TEST NO. 13.

The *roasted* product from roast No. 5 was used for this test.

CYANIDE TEST.

Strength of solution, 0.25 per cent.

Time of percolation, 96 hours.

Weight of ore, 5.0 kilos through 40 mesh.

Heads assay, 0.40 ounces ($8.27) per ton.

Tails assay, 0.10 ounces ($2.07) per ton.

Extraction, 75 per cent.

TEST NO. 14.

NO. 3 ORE ROASTED.

A. AMALGAMATION TEST.

Weight of ore, 2.0 kilos through 40 mesh.

Amalgamated three hours with 1-5 pounds mercury.

Original ore assay, 0.40 ounces ($8.27) per ton.

Tails assay, 0.40 ounces ($8.27) per ton.

Extraction, nil.

B. CYANIDE TEST.

Strength of solution, 0.25 per cent.

Time of percolation, 48 hours.

Weight of ore, 1.7 kilos through 40 mesh.

Heads assay, 0.40 ounces ($8.27) per ton.

Tails assay, 0.10 ounces ($2.07) per ton.

Extraction, 75.0 per cent.

Total extraction 75.0 per cent.

CONCLUSIONS. From the foregoing tests, the following conclusions may be drawn concerning medium and high-grade ore:—

No. 1.—That in the oxidizing roasting of an antimony-gold ore, from sixty to seventy-five per cent. of the antimony may be eliminated, and practically all the gold remains behind in the residue.

No. 2.—As far as these experiments show, the extraction of gold in the amalgamating pan is an uncertain factor, and is in some cases *nil.*

No. 3. - It is to be doubted if simple amalgamation will work successfully upon the medium or high-grade ore which has been roasted in the ordinary way in the reverberatory furnace.

No. 4.—Simple percolation with cyanide solution appears not to give satisfactory extraction. The use of bromo-cyanogen increases the extraction, but does not bring it up to a sufficiently-high percentage to pay for its use.

No. 5.—The application of combined amalgamation and cyanidation, as most commonly applied, fails to give an extraction in simple laboratory tests which would successfully compete with smelting at $6 per ton.

The following may be concluded concerning low grade ore :

No. 1.—Simple amalgamation in an amalgamating pan fails to give any appreciable attraction.

No. 2.—Simple percolation with cyanide on the *raw* product fails to give any considerable extraction, and yields foul cyanide solutions.

No. 3. —This low grade ore may be successfully roasted, eliminating most of the antimony, and leaving the gold behind in the residue.

No. 4.—The low grade ore after it is roasted gives promise that it may be successfully treated by percolation with cyanide solution to give an extraction which will be commercially profitable.

No. 5.—The cost of roasting this low grade ore should not exceed $1.00 per ton.

The reasons for the failure of amalgamation may be two. First, the condition of the gold in the raw ore Most of the gold is very fine, but where it is coarse enough to be visible it has the appearance of rusty gold. It has a dark yellowish-brow color, is powdered, when it is crushed, very fine, instead of retaining its malleability, and in this state is not readily attacked by mercury. Secondly, during the roast the gold might easily become coated with a film of antimony-trioxide or tetroxide, and thus not lend itself to amalgamation. Antimony tetroxide is extremely insoluble in most of the common reagents, so that if the gold is covered with this substance, it is very difficult to free it.

The reasons for the failure of simple cyanidation may be two. First, the gold may be coated as explained in the preceding paragraph, and thus be in a condition not to be dissolved by cyanide. Secondly, the fine carbon deposited from the flame of the fire in the furnace and the retention of some of the carbon added to the hearth, and therefore necessarily present, may precipitate gold which has already been taken into solution by the potassium cyanide.

(Signed.)

FREDERIC H. SEXTON.

June 12th, 1905.

SUMMARY OF RESULTS IN ROASTS.

No. of Roast.	Duration of Roast hours.	RAW ORE.		ROASTED ORE		GOLD IN RESIDUE.	ANTIMONY ELIMINATED.	REMARKS.
		Antimony.	Gold. Oz. per T.	Antimony %	Gold. Oz. per T.	%	%	
1	16	45.55	2.82	1.82	4.48	100	96.01	The raw ore was mixed with ¾ of its weight of ground Anthracite before roasting and more added toward end of roast.
2	4	20.32	1.20	7.0	......	....	70.0	No Carbon added to ore whatever.
3	10	20.32	1.20	......	2.3	100	....	10% of weight of ore in fine Anthracite added toward end of roast at intervals.
4	6½	20.32	1.20	5.35	1.64	100	73.7	6% of weight of ore in fine Anthracite added at intervals in roast.
5	1	5.99	0.36	1.23	0.40	100	79.4	Roasted in hot furnace with a restricted amount of air.

SUMMARY OF EXPERIMENTS.

No. of Test.		Weight. Kilos.	Size of Material.	Ground in Pan.	Amalgamation.		Cyanidation.		Original Ore.	Residue.	Extraction	Total Extraction	REMARKS.
				Hours	Weight of Mercury K	Hours.	Solu. %	Hours.	Gold Oz. per T.	Gold. Oz. per T.	%	%	
1	(1)	4	30*	....	....	....	0.5	24	4.48	2.78	....	38	Plain cyanide.
	(2)	4	30*	....	....	....	0.5	21	4.48	2.60	....	42	Bromo cyanide.
2	(a)	4	30*	....	....	....	0.5	72	1.20	0.64	46.3	....	Cyanided first and the tails amalgamated by rotating a thin pulp with mercury in a bottle.
	(b)	"	"	....	0.112	8	....	....	0.64	0.27	59.7	78.2	
3		0.69	60*	....	0.112	8	....	....	1.20	0.52	....	57.0	Amalgamated by rotating pulp and mercury in a bottle.
4	(a)	19.5	20*	....	0.9	8	....	....	1.20	0.54	55	....	Was ground and amalgamated in a clean-up barrel
	(b)	0.45	v. fine	....	....	....	0.5 and 0.2	24	0.54	0.33	38	72.7	Tails from amalgamation were treated as slimes and cyanided by agitation.
5	(a)	2	....	2	0.09	4	....	....	1.64	1.28	21.9	....	In tests No. 5 and succeeding tests the ore was first amalgamated in a pan and then the residue was treated with cyanide solution. Therefore letters (a), (b), (c) represent subsequent operations on the one batch of ore in the one test.
	(b)	1.86	fine	....	....	....	0.3	96	1.28	0.60	53.1	63.4	
6	(a)	2	....	2	0.09	6	....	....	1.64	1.49	9.1	....	
	(b)	1.72	fine	....	....	....	0.3	96	1.49	0.74	50.3	54.9	
7	(a)	2	....	2	0.09	8	....	....	1.64	1.62	1.21	....	
	(b)	1.90	fine	....	....	....	0.3	96	1.62	0.80	50.61	51.2	

No. of Test.		Weight Kilos.	Size of Material.	Ground in Pan.	Amalgamation.		Cyanidation.		Original Ore.	Residue.	Extraction	Total Extraction	REMARKS.
				Hours.	Weight of Mercury K.	Hours.	Solu. %	Hours.	Gold Oz. per T.	Gold Oz. per T.	%	%	
8	(a)	2	....	2	0.90	8	....	....	1.64	1.22	25.60	....	
	(b)	1.79	v. fine	....	....	....	0.3	96	1.22	0.84	31.15	....	Percolation test.
	(c)	1.70	v. fine	....	....	....	0.3	6	0.84	0.65	22.80	60.4	Agitation slime test.
9	(a)	2.5	40*	not ground	0.09	6	....	....	1.64	1.12	31.7	....	Ore treated with a preliminary wash of K. C. N solu. before amalgamation.
	(b)	2.13	40*	....	....	....	0.3	96	1.12	0.79	29.5	....	Percolation test.
	(c)	1.0	....	....	....	....	0.25	6	0.79	0.78	1.3	52.4	Agitation test.
10	(a)	2.2	40*	not ground	0.09	6	....	....	1.64	1.26	23.2	....	Ore given a wash of 2% caustic soda for 12 hours before amalgamation.
	(b)	1.86	40*	....	....	....	0.25	96	1.26	0.96	23.8	41.5	
11	(a)	2.0	40*	not ground	0.09	4	....	....	1.64	1.63	1.0	....	
	(b)	1.77	40*	....	....	....	0.25	72	1.63	0.62	61.9	62.2	
12		5.0	40*	....	....	....	0.25	96	0.36	0.29	19.4	....	Raw ore.
13		5.0	40*	....	....	....	0.25	96	0.40	0.10	75.0	....	Roasted Ore.
14	(a)	2.0	40*	not ground	0.09	3	....	....	0.40	0.40	nil	....	
	(b)	1.7	40*	....	....	....	0.25	48	0.40	0.10	75.0	75.0	

An abstract of an interesting paper on the electrometallurgy of antimony, by Mr. Anson G. Betts, appears in the "Electro Chemical and Metallurgical Industry," VII, No. 10, page 380, and is well worth reading.

In this Province the great question at present is the economical reduction of the low grade portion of the ore, and the saving of as large a percentage as possible of the gold in both the low grade and high grade ores.

As will be seen in Mr. Mason's, Prof. Sexton's and Mr. Brown's papers, this question has been gone into in more than a preliminary manner.

The following notes from the "Mineral Industry" for the years 1899 and 1901 refer to the general secrecy maintained in the progress of the metallurgy, but cite some comparatively new methods in leaching and by electrolysis:—

"The control of the antimony industry by a few producers, and the secrecy with which they envelop their operations, prevents the appearance in technical literature of anything but scattered and incomplete notes as to progress in the methods of winning this metal, and there is nowhere any account of the best practice of the present day. This is unfortunate, since there is known to have been considerable improvement in the methods of at least the English smelters, who have been probably the most progressive in this branch of metallurgy.

"There were few patents granted in 1898 for the treatment of antimony ores. One of the most interesting was that of N. W. Edwards, of London, who proposes to treat gold and silver-bearing antimony ores by lixiviation with a seven per cent. solution of calcium sulphide (cold) in large vats, provided with stirring apparatus, whereby the antimony is dissolved as sulphide, and the gold left in the residue, whence it may be recovered by an ordinary method. The solution is drawn off and treated in closed vessels with carbonic acid obtained by burning lime, whereby the calcium is precipitated as carbonate, which is filtered off, The solution is then treated again with carbonic acid, which precipitates antimony sulphide. The sulphuretted hydrogen which is given off by the decomposition of the double sulphide solution is conducted through milk of lime to regenerate calcium sulphide."

Several wet processes for the treatment of low grade antimony ores, especially those which are gold-bearing, like the Australian and Portuguese, have been devised recently, the more important of them being electrolytic. The following summary includes most of those which have been described in the technical periodicals of the past two or three years, none of them having come yet into practical use of a large scale :

(a.) Smith & Hargreaves dissolve the sulphide of antimony in hot chlorhydric acid and precipitate the antimony by iron or zinc. According to other methods, basic chloride of antimony is precipitated from the chlorhydric acid solution by water or by electrolysis.

(b.) Lyte roasts antimony-bearing lead, silver and copper ores chloridizingly, condenses the antimony vapor in a solution of salt, and precipitates the metal from the solution of iron or zinc. This process requires complicated condensation apparatus.

(c.) Borchers leaches the ore with a solution of sodium sulphide and precipitates the antimony electrolytically.

(d.) Sanderson electrolyzes plates of gold-bearing antimony in a solution of antimony oxide with sodium chloride, whereby the antimony at the cathode is dissolved and is then precipitated in small scales while the gold is separated.

(e.) Kipp dissolves the ore in a solution of an iron salt preferably a haloid salt, according to the following reaction:

$$2Fe_2Cl_6+Sb_2S_3=2Fe_2Cl_4+Sb_2Cl+S.$$

The solution is then electrolyzed, whereby metallic antimony is precipitated.

"Electrolytic deposition.—H. Ost and W. Klapproth have investigated the electrolytic deposition of antimony and found that pure antimony can be easily precipitated from its salts by the use of a porous diaphragm. Where the metal is to be separated from tin, however, the E. M. F. employed must not exceed one volt. The cell used consisted of a platinum basin, a porous Pukali cell and a platinum disc anode. A solution of Schlippe's salt, Na_3Sbs_4, containing 0.09859 g. Sb. in 10 c. c. and one of pure Na_2S containing 195 g. per litre were used. The precipitation of antimony being the result of a secondary reaction, the antimony solution together with the sodium sulphide is placed in the cathode compartment while sodium sulphide alone is contained in the anode section. The best results were obtained with a current of 1 ampere at from 1 to 2 volts and a temperature of 70° C. operating for at least an hour."

A somewhat similar patent to that of Mr. Edwards is the following:

Late patent by J. S. MacArthur in England, dated May 14th, 1904, by which it is proposed to treat comminuted ore containing antimony with a solution of a fixed alkali hydroxide, such as sodium hydroxide, of not more than 4 per cent strength (and perferably not more than 2 per cent, unless the ore contains oxide of antimony) at a temperature exceeding 50 C. The filtered solution is precipitated by carbon dioxide, the reaction being assisted by cooling. The precipitate is collected in a filter-press, and the filtrate containing (say) sodium carbonate, is causticized by lime for further use. The process is claimed to be particularly applicable in the treatment of ores containing antimony in the form of stibnite.

Since the above notice of the patent Mr MacArthur has apparantly perfected the treatment.

To use Mr. MacArthur's own words in a speech in August, 1905, at St. John, N. B., before a meeting of the shareholders of the Dominion Antiomy Co., he says:—

"I instituted researches, and I went on this principle, that if we could remove the antimony from the ore, we would leave an ordinary gold ore, amenable to any ordinary method of treatment; and in a comparatively short time I got the main point of this process, but it took much longer to work out the details—details that I do not propose to trouble you with this evening. But the main points of the process are these: In the first place, you dissolve the antimony from the ore by caustic soda. As described by Dr. Andrews, the solution is weak, but hot, an operation conducted on a small scale, if you had it in a glass, something like this,--taken cold, heated over a spirit lamp, and by the time it has got to the boiling point, all the antimony has been dissolved. The operation does not take anything more than the time required to dissolve it. It takes time, of course, but you do not require to say you must give it one day or two days; it is just about as quick as you can work it. That solution is treated with the cheapest acid we can get, that is, carbonic acid, derived from the ordinary fires you can get in all metallurgical works. You can get carbonic acid wherever you burn coal or coke. That throws down antimony sulphide in a perfectly-pure state; there is no earthy matter with it, so the troubles of smelting there disappears. Remember, it is not the smelting of antimony that causes the time, and fuel, and money, it is the smelting of the earthy matter along with it. When we get our precipitate of antimony sulphide, there is no earthy matter, and therefore it is easily melted. As Dr. Andrews pointed out, you could go on and make pigments.

As I said, you are using caustic soda. Caustic soda is rather dear. It costs here about $60 a ton, I suppose. Well, if it does, the antimony sulphide is worth a good deal more. But I admit the caustic soda is too dear to lose. If you are going to use it you must use it over and over. Well, after doing its work, and the antimony being precipitated from it, a solution remains as carbonate of soda, which is brought back to its original state by boiling it with lime. Now lime, all over the world, is the cheapest chemical we have, next to coal, so that by the expenditure of an equivalent of lime, we extract all the antimony from the ore; that is, all that exists as sulphide. That is, we expend heat, and labor, and lime; the soda is recovered for use over and over again. Naturally, in using it, there is a loss in handling it. I do not know what it would be in this case, but assuming it at five per cent., a reasonable figure, there is a very large margin of profit. Now, that really is the solution of the problem, because, having removed the antimony, the ore is left as an an antimonyless gold ore. It is simply gold ore, comparable with any other gold ore, and amenable to any gold process you might specify for a similar gold ore that had never seen antimony."

One of the difficulties in the way of a successful treatment by cyanide of the residues containing gold, either from concentration or some other method, is given on pages 106 and 107 of "Cyaniding Gold and Silver Ores," by Julian and Smart, where it is stated :—

"*Antimony Sulphide*, as Stibnite, is often found associated with gold ores, and is sometimes highly auriferous. Like arsenic, antimony does not form any definite compound with cyanide, but the sulphide is very soluble in caustic alkeli, and decomposes cyanide, combining with the alkali forming antimonite, and this antimonite, also some K. Cy. S. is formed, H. Cy. is evolved. The antimony compounds act as strong deoxidizers, and remove the absorbed oxygen from the solution by forming antimonite, and this antimonite.

"Gold and silver may be rendered almost insoluble from this cause, and also from the fact that much of the cyanide is destroyed. Other antimony minerals, as antimony bloom, senamontite, and antimony ochre, occur in gold ores, but much less frequently than stibnite, and are less difficult to deal with."

Referring to the extraction of the gold from the residue by cyaniding, the following recent letters from J. S. McArthur & Co. are self explanatory and read very satisfactorily. It would almost appear that the main difficulty was about solved, although of course when it comes to actual practice more difficulties may present themselves. It is understood that such a "Tuda" plant as described has been installed at an auriferous antimony mine in France.

[Copy.]

74 York St., Glasgow,
24th November, 1905.

Messrs. Dominion Antimony Co.,
199 Hollis St., Halifax.

Dear Sirs :—In response to a cable message received from our Mr. Chas. McArthur, we have pleasure in reporting that we have extracted over 95% of the gold contents of your 2nd class ore by treatment with caustic soda for the removal of the antimony followed by calcination and cyanide treatment. The gold contents were about $23 per ton on the original ore and the gold left in the residue was less than $1. This test was carried out under normal laboratory conditions, and can be taken as an indication of what should be done or at least approximated on a large scale, but must not be taken as a guarantee.

You may remember that the writer reported last August that caustic soda treatment removed between 90% and 95% of the antimony in the ore. It is not possible to give the cost of the plant required at West Gore until the site and all local conditions are known. We shall, however, look up our records to find the cost of similar plants for calcination and cyanide treatment in other parts of the world, principally in Western Australia, aud shall send you the information in a few days.

We are,

Yours very truly,

(Sgd.) J. S. MacArthur & Co.

P. S.—We regret that we are unable to report on the No. 3 ore. When Mr. MacArthur was at the mine on 8th August last, he arranged that a sample of 40 or 50 lbs. should be sent over. This has not yet come. As soon as it arrives we shall begin our tests on it.

[Copy.]

74 York Street, Glasgow,
2nd December, 1905.

Messrs. the Dominion Antimony Co., Ltd.,
199 Hollis Street, Halifax, N. S.

Dear Sirs,—We wrote you last on the 24th November, and we then promised to send you approximate working costs for the treatment of your ores.

1st. The extraction of the antimony by our caustic soda method.

2nd. The extraction of the gold from the residual ore by roasting, and a subsequent treatment of the roasted material by cyanide.

Cost of crushing..............................	2s.	6d.
Cost of treatment by caustic soda, per ton, treating 40 tons per day...	7	3
Cost of roasting.........	2	6
Cost of cyaniding......	3	0
	15s.	3d.

The approximate cost of the plants is follows :

Crushing plant	£1200 0 0
Caustic soda plant	1100 0 0
Roasting and cyaniding plant	1400 0 0
	£3700 0 0

The working costs of the caustic soda process are based on similar work, carried out under our own supervision.

The costs of plant refer only to costs shipped f. o. b., and do not include cost of erection or cost of buildings, which are largely a matter of site, local facilities, and trade conditions.

We are not in a position to give a close estimate of cost of the furnaces required to reduce the precipitated stibnite to metal, but the whole installation should not exceed £1,000.

We are, dear Sirs,

Yours faithfully,

(Sgd.) J. S. MacArthur & Co.

In the meanwhile Mr. McNeil has not been idle in trying to enlarge the possible market, and has gone to much trouble and expense in experimenting and in conducting a voluminous correspondence.

He states that he has received no fewer than twenty-five offers of alleged "perfect processes;" but he has fortunately kept the mine disentangled. These processes are offered for sums ranging over $100,000.

Conclusions. At least two processes for the extraction of the antimony contents have been devised, and both are apparently practicable. In both the case of the caustic soda treatment and the volatilizing and fume collecting process of Mr. Mason from 90% to 100% extraction is claimed.

The residue can then either be sold (see offer of Am. Smelting and Ref. Co., who pay for s. b. all the gold and the lead) or it can be treated by smelting or cyanidation. The extractions are also claimed to be high in each of these cases.

It now remains for the company to decide on the most economical method and to erect a test plant at the mine.

IRON, ETC.

Great activity has been shown by the operations in the Iron fields of the Province during the year.

The work at Londonderry, of which a detailed note is given below, has progressed favourably.

At Brookfield, 800 tons were mined and used by the Londonderry Iron and Mining Company.

During the year considerable prospecting was done on the western end of iron areas at Upper Kemptown, Colchester County, controlled by the estate of Dr. McKay, J. J. Snooks, and A. Learment, of Truro Here the drift indications had been promising. Limonite was encountered in various openings made approximately on the strike of that opened up at the so-called Monroe shaft of these gentlemen at the same place. At the eastern end of the district specular hematite occurs, as well as limonite, the occurrences generally resembling somewhat those of Londonderry. The prospecting of the district, so far, indicates the presence of ore over a distance of some two miles, or more.

The following assays, made at the laboratory of the Londonderry Iron and Mining Company, refer to samples taken by me in November, 1903, at Arisaig. a memorandum of which appears in the Annual Report for the year ending September 30, 1903:

IRON BROOK.

	Iron.	Insoluble.
No 1	35.13	39.04
No. 2	39.00	34.55
No. 3	40.87	29.67
Nos. 4 and 5	32.98	43.06
No. "A"	35.85	43.07

CAMPBELL'S BANK.

No. 2	34 35	42.64
No. 6	43.16	29 23
Tunnel vein	45.74	24.82
East of road	45.89	26.01
Black vein, magnetite, on Dan. Macdonald's farm	36.45	34.68

Londonderry.

Londonderry Iron and Mining Co. Extensive mining operations have been carried forward during the financial year, and preparations are under way for an increased output.

This company do practically all their mining by contract, a system which, though not usually followed in the metal mines of the Province, appears to work well here, both for the company and the contractor.

In some cases, the miner supplies his own dynamite, timber, and other material, and in other cases the company supply them.

The deposition of the ore is usually erratic, though it is plentifully distributed through the hills forming Folly Mountain range for a distance of over ten miles.

For this reason, no special system of mining can be followed to any extent. The large bodies of ankerite and low-grade "white" ores are generally worked by quarries and open cuts, which are tapped by chutes from the tortuous adit workings which follow the pockets, and comparatively-small detached bodies of higher grade limonite and specular ores.

These often occur, as well, mixed through the "white" ores and ankerite. This latter carries as high as thirty-five per cent. of lime, and, though low in iron, is the only flux used as a flux at the furnace.

Mining through shafts is employed at a few points, and, though vertical, these are generally shallow.

A memorandum of the work done during the year at the several points along the range is given below. The workings are taken in order from west to east:

MORRISON'S HILL An old level, known as the "Boutillier" level, was cleaned out, and a small amount of drifting was done. As this level is situated some distance from the company's transportation railroad, and the ore had to be hauled by teams, the work was abandoned.

CUMBERLAND BROOK WEST. The lower level was extended and the stopping continued between this and the upper level.

In August, a contract was let to M. Morash, who, with ten men on double shift, has driven the lower level and sunk a winze from it for a depth of 25 feet to intersect a body of ore on its dip. The upper level has been abandoned.

CUMBERLAND BROOK EAST. In last year's report it was mentioned that these works were being pumped out. The unwatering being effected, and the mining begun, the resulting ore was found to be unsuitable for the smelting practice as then carried, on and the pit was allowed to fill. At present, however, this ore can be handled satisfactorily, and in August unwatering was again commenced. An intermediate level between No. 5 and 6 has been cleaned out and retimbered, and the East incline from this level to No. 9, at the bottom is being prepared for rails, and a permanent steam supply pipe is installed for the pumps. A dam has been constructed at No. 8 level, on this incline, and mining will be begun, it is hoped, by November 1st. In the meantime a little ore is being got from the intermediate level.

George and Arthur Forman are the contractors here, and at present only have 10 men employed in single shift.

The plant consists of two boilers, which supply the pumps, and an air compressor supplying one machine drill.

MARTIN'S BROOK. The cleaning out and extension of No. 6 level was begun again, and at the end of September the face was some distance from the tunnel mouth on the west side of the Brook. At a point about 40 feet from the face a cross-cut is being driven south to tap a large body of "white" ore in an old stope above No 7 level.

Six men are working here on double shift.

COOK'S BROOK. Work in the two main levels—No. 1 East and No. 1 West—has ceased during the year.

On top of the hill above these levels four shafts have been sunk by the company, varying in depth from 20 feet to 35 feet, and at the time of my visit some remarkably fine ore was being produced.

Seven men are employed here.

OLD MOUNTAIN. At this place, and at East Mines, by far the bulk of the company's operations are being carried on.

Jonah Esau, the veteran Cornish miner of the district, is foreman here, as well as at Cook's Brook. About eighty men are engaged in mining, and work double shift.

The surface arrangements have been remodelled, and the three-track gravity tramway has been put in order.

At No. 1 level, a new magazine, dry-house, blacksmith's and carpenter's shop have been built.

In No. 1 and No. 2 level ore is being obtained chiefly from the chutes connecting with the quarry workings, as mentioned above.

Several winzes are also being sunk from the levels.

From No. 2 level a winze connects with No. 3 level, near the face.

Both No. 1 and No. 2 levels have been driven during the year, as shown on the map of the underground workings on file.

In No. 3 level, which is now in course of driving, a cross-cut has been turned off southerly, and the excavation has passed under No. 2 level, with which, as shown above, connection has been made, and it is approaching No. 1, with which connection will also be made.

No. 4 level is being driven in to meet a quarry working from the surface.

Hand steel is in use, except in No. 3 level, where one machine is used in the cross-cut.

All the above-mentioned workings are grouped along the ridge, west of the furnace at Folly River, and the total distance from the Boutillier level, at the extreme west, to the Old Mountain workings at Folly River, is about three and a half miles.

Between the Old Mountain workings and the East Mines, about six miles to the east of Great Village River, some little work had been done as mentioned in last year's report at the "Drummond Level," "Henderson" and the 'Ferguson Level," and at "McSwain's Brook" and the "Rogers Working." These places are idle at present.

EAST MINES

At these workings, however, activity is renewed. Martin Stephens is in charge as foreman, and 108 men are engaged chiefly on contract.

The old Slack's Brook tunnel is being cleaned out and retimbered, preparatory to tapping a large body of ore supposed to extend under some old quarry workings to the north-east. Another adit has been driven in on Totten's Hill. This has already connected with the old shaft workings, and with an open cut, and is now driving to meet a shaft to the eastward.

At several other points ore is being extracted by open cut and surface pits.

About a mile east of Totten's Hill some prospecting was done during the year, and a body of ankerite is said to be exposed containing an enormous tonnage.

It is possible that a railway connecting with the company's line may be built, and that this body may be worked on a large scale during the coming season.

Several steam drills are in use at the East Mines.

During the year the coke ovens and furnace have been in operation, and 18,614 tons of pig iron were produced from September 30th, 1904, to September 30th, 1905.

Nearly 100 tons a day are being turned out now and a record casting of 108 tons was made on June 20, 1905.

During the past severe winter, transport facilities were paralysed, and a large quantity of stock pig lies stacked in the yards.

The pipe foundry, an allied industry, is also in full operation, with contracts ahead, so I am told, for several months.

A summary of the work done and of the output at the several workings is attached:

Name of Working.	Feet Drifted.	Feet Sunk.	No. of Men employed.	Tons of Ore Mined.	
				"Black Ore"	Ankerite.
East Mines................	1300	500	90	7036	20256
Old Mountain	1250	600	75	9324	14620
Cook's Brook	....	....	6	1311	70
Cumberland..............	350	200	20	2264	1575
Sundry Places...........	75	50	8	700	1106
*Brookfield	....	....	....	800	....
Total.................	2975	1350	199	21435	37627

*Brookfield not worked by this Company, but the ore obtained from the operators by the L. G. and Mg. Co.

Torbrook.

Londonderry Iron and Mining Co.
H. McL. Weir..Manager.
John Newhook, John Hopkins, ...Foremen.

There are sixty-four men employed,—formerly on two shifts,—now beginning three shifts per twenty-four hours.

During the early part of the season the Nova Scotia Steel and Coal Company had an option on that portion of the field controlled by Messrs. Brookfield and Corbett, and did considerable exploratory work in tracing the outcrops on the north side of the field, both by trenching and boring. An account of the latter work is given elsewhere in the report. (See Boring Machines.)

About August, 1905, the Londonderry Iron and Mining Company obtained a year's option on this property, and are now working throughout the district from Nictaux to the Leckie mine.

Their work during the year at the several points includes the following operations:

THE LECKIE WORKINGS. The shaft has been deepened. It appears to be flattening from the No. 3 level down, but at a short distance from the bottom it plunges over sharply, the dip of the bed being nearly vertical.

Very little work has been done on the east side of the shaft.

On the west side, No. 3 level has been extended to a point 560 feet from the shaft. No. 4 is 557 feet from the shaft; No. 5 is 480 feet from the shaft, and the new level, No. 6, is 500 feet from the shaft.

All the ore has been stoped out from No. 6 level up to the surface between the boundary line of the Banks property and the main shaft. The faces of levels Nos. 3, 5 and 6 are in bodies of excellent-looking ore, and level No. 4 is at present crossing through a faulted patch. It is expected that the face of this level will soon be in ore again.

It is contemplated to drive No. 2 level, which has been idle for a long time, further west. The face is at present in one of the barren patches mentioned, but it is over 500 feet west of this shaft.

WARD PROPERRTY. Work was commenced at this property on the west side of the Bloomington Road in January, 1905, and ceased in August.

Three pits, the deepest of which was not over 20 feet, were put down on a vein of compact magnetite, which measured 9 feet 10 inches in pit No. 4. It contained much lime and fossils. The strike here was about N. 60° E. and the dip 80° S.

J. HEATLEY. PROPERTY. This property lies immediately west of the Halifax and South Western Railway track on the west side of the Nictaux River, and about one mile up stream from Nictaux.

Two pits were put down to a depth of about 20 feet on a vein supposed to be a continuation of one of the beds east of the river.

FLETCHER WHEELOCK'S. The shaft sunk here by G. E. Corbett, about 18 months ago, was pumped out and deepened to 50 feet.

CONTRACT SHAFTS. Contracts have been entered into with Mr. Patterson, the contractor of the Allan Shafts at Lourdes, to carry on the sinking at Wheelock's shaft to a depth of 150 feet and to sink a new shaft at Hoffman's farm, between Wheelock's and the Leckie mine, to the same depth.

Twenty-two men are employed in erecting plant for this work.

This includes at Wheelock's:

1 new 60 h. p. boiler (return tubular.)

1 double drum hoist and a Rand compresser from the works at Central Rawdon.

1 Knowles 14 x 7 x 14 special vertical sinking pump and 1 feed pump.

At Hoffman's there are installed:—

1 new 60 H. P. Boiler (return tubular.)
1 new Ingersoll Compressor.
1 double drum tandem hoist from Londonderry.
1 Knowles sinking pump same as above, and
1 feed pump.

The shafts are to have three compartments (one hoistway); 14 feet 6 inches in sectional measurement, and are sunk on the dip of the ore.

The timbering at first was square set, but now stull timbering is being put in.

It is probable, in case the ore maintains its good character, that the shafts will be continued to a depth of 300 feet.

A summary of the work done and of the ore produced during the year is here given:

From September 30th, 1904, to September 30th, 1905.

NAME OF WORKING.	Feet. Sinking.	Feet Drifting.	Ore mined.
Leckie Mine	None	About 1015	13373
Hoffman's	16	....	35
F. Wheelock's	50	....	430
Ward's	50	15	700
Heatley's	60	10	none
	176	1040	14538

COPPER.

The Colonial Copper Company performed some underground work at the Hanway lode, and in the early summer Mr. Martin Schwerin, of New York, visited the property. In September, work ceased at the property.

MANGANESE.

About twenty-eight tons were mined at Tennycape during the year.

Boring Machines.

Dr. E. Gilpin,

Deputy Commissioner of Public Works and Mines.

Sir:—In transmitting the report on boring for the year ending September 30th, 1905, I have pleasure in drawing attention to the very satisfactory work done by Mr. A. Hayman. He has reduced costs, and increased the average speeds of boring, and has been universally commended by all those who have been in any connected with him in his work.

Mr. W. S. Rutherford also deserves praise for his work, the results of which, though not showing the high standard of efficiency obtained with No. 2 drill, are good, considering the great disadvantages under which his drill (No. 1) was operated.

As in the last report, the cost records (unless otherwise noted) include all items except transportation charges on drills and wear and tear.

With regard to the comparative carbon and general costs, it must be remembered that in the majority of published cost records the price of carbons are very materially less, (often an average of 60% to 70% less) than at present. Even leaving out this factor, it is doubtful whether the records of carbon cost at the Caribou borings in the tough Cambrian quartzites and slates have been beaten. I have seen no better published instances. Indeed those cited by the agent of the Sullivan Drill Company (presumably the best cases he could collect) in the proceedings of the N. S. Mining Society do not even approximate those given here, and the former were computed with prices of carbons considerably lower than at present.

With regard to general costs, in the contract bore-hole at Dolliver Mountain, done with an improved hydraulic feed Sullivan machine, run by one of the manufacturing company's selected men, the contract price was, so I am credibly informed, four dollars per foot, and the actual cost per foot considerably greater. The carbon cost in this case was probably much higher in proportion to the general cost, as several extra large stones were broken. It is true the hole was two inches in diameter at the start, but it was found necessary to reduce this to one inch at less than one-third of the depth bored (five hundred feet.)

I may say that in the majority of cases the published records in this respect are very carefully kept, particularly as regards the carbon wear. The stones are weighed with duplicate tested balances at the department before being set, and after the completion of each boring operation.

A comparative test was made with selected bortz stones and best black carbons. The bortz cost $12 per karat, and the carbons $64 per karat. A total of 2,474 feet was bored with carbons, at an average cost of 3.8 cents per foot, and in the same rocks 232 feet bored with bortz cost 14.2 cents per foot.

OTHER BORING. Some very interesting and important work has been done in the Province during the year with churn or cable drills.

The deepert hole ever put down in the Province, which, by the way, is still in progress, is situated opposite Trenton, and near New Glasgow, at the site of the first hole started with the department's No. 6 drill. This hole is now over three thousand feet deep, and is still in the conglomerate mass supposed to overlie the coal measures there. The work is being pluckily done by a local syndicate, who deserve every encouragement.

Near Halfway River Lake, in Cumberland County, the Standard Coal Company bored through the conglomerate, and into the coal measures, at a depth of 2,350 feet. A new hole has been commenced by this company some distance away from the first location, and it is hoped that the thickness of the conglomerate measures here will be much less.

In the event of their finding the coal measures at a reasonable depth, No. 6 (Government) drill will be employed to continue the boring, so that cores may be obtained. This second hole is now about eight hundred feet in depth, and it is expected that the coal measures will be struck at about one thousand feet.

The rented store-house at Westville was found to be inadequate for the purposes required, and a new building, specially adapted, was acquired by the department at Hantsport, where all the drills and boilers can be safely stored and conveniently handled at the railway track. It is close to the junction of the Midland Railway, connecting with the I. C. R., and half way between Halifax and the junction of the Halifax and South Western Railway with the D. A. Railway at Middleton.

Facilities for all ordinary repairs can be had at Windsor, Kentville, or Truro.

The itinerary table has been brought up to date, and is attached.

ITINERARY TABLE.

No. and Description of Drill.	Locality of Boring.	Mineral Bored for.	Dates of Occupation.
No. 1 “Calyx” steam) 1000 feet.	Nictaux, Annapolis Co.	Iron.	Oct., 1900, to June, 1901.
	Kennetcook, Hants Co.	Coal.	Aug., 1901, to Dec., 1901.
	River Inhabitants, Rich. Co.	“	Mar., 1902, to Sept., 1902.
	Glendale, Richmond Co.	“	Sept., 1902, to Oct., 1902.
	Port Hood, Inverness Co.	“	Oct., 1902, to Dec., 1903.
	St. Rose, “ “	“	Dec., 1903, to July, 1904.
	Cheticamp, “ “	“	July, 1904, to Jan., 1905.
	Torbrook, Annapolis Co.	Iron.	Jan., 1905, to June, 1905.
	Storehouse.		June, 1905.
No. 2. (“Diamond” steam) 850 feet.	Pottle's Lake and Ferris Lake Cape Breton Co.	Coal.	Nov., 1900, to Oct., 1901.
	Drummond Colliery, PictouCo.	“	Nov., 1901, to Nov., 1902.
	Foxbrook Road, do.	“	Nov., 1902, to Sept., 1903.
	Stanley, Hants Co.	“	Sept., 1903, to April, 1904.
	Kemptown, Col. Co.	“	April, 1904, to Aug., 1904.
	Storehouse.		Aug., 1904, to Jan., 1905.
	Caribou.	Gold.	Jan., 1905, to June, 1905.
	Storehouse.		June, 1905, to July, 1905.
	Debert.	Coal.	July, 1905.
No. 3. (“Diamond” hand) 400 feet.	Whycocomagh, Inverness Co.	Iron.	1901 to Oct., 1901.
	Bridgeport Basin, C. B. Co.	Coal.	Nov., 1901, to Nov., 1902.
	Mira Road, Cape Breton Co.	“	March, 1902, to July 1903.
	Polson's Brook, AntigonishCo.	Iron.	July, 1903, to Oct., 1903.
	Pleasant Valley, Antig. Co.	Coal.	Oct., 1903, to Dec., 1903.
	Storehouse.		Dec., 1903, to Jan., 1905.
	Torbrook, Annapolis Co.	Iron.	Jan., 1905, to June, 1905.
	Storehouse.		June, 1905.
No. 4. (“Diamond” hand) 400 feet.	Musquodoboit Valley, Hx. Co	Coal.	1901 to March, 1902.
	Stewiacke Valley, Hx. Co.	“	Mar., 1902, to Oct., 1902.
	South Maitland, Hants Co.	“	Oct., 1902, to Feb., 1903.
	Lake Ainslie, Hants Co.	Iron.	Feb., 1903, to May, 1903.
	Boularderie Island, C. B. Co.	Coal.	May, 1903, to Oct., 1903.
	Glendale, Inverness Co.	“	Oct., 1903, to Dec , 1903.
	Storehouse.		Dec., 1903, to July, 1905.
	Debert, Col. Co.	“	July, 1905.
No. 5. (“Calyx” steam) 1000 feet.	Hantsport, Hants Co.	Coal.	Sept., 1901, to Aug., 1903.
	Apple River, Cumb. Co.	“	Sept., 1903, to Jan., 1905.
	Storehouse.		Feb., 1905.
No. 6. (“Calyx” steam) 3000 feet	New Glasgow, Pictou Co.	Coal.	Sept., 1902, to Sept., 1904.
	Port Morien, C. B. Co.	“	Sept., 1904, to June, 1905.
	Storehouse.		June, 1905.
No. 7. (“Calyx” steam) 350 feet.	Broad Cove, Inv. Co.	Coal.	Mar., 1902, to June, 1903.
	Port Hood, Inv. Co.	“	July, 1903, to Sept , 1903.
	Barra Head, Richmond Co.	Limestone.	Oct., 1903, to Dec. 1903.
	Westville, Pictou Co.	Coal.	Feb., 1904, to April, 1904.
	Storehouse.		April, 1904,

Drill No. 1.

Torbrook. The drill was stored at Cheticamp after boring, and in the winter it was moved to Torbrook, having been obtained by the Nova Scotia Steel and Coal Company, who it is understood held an option on the "Brookfield and Corbett" areas.

No. 1 Hole. Boring was commenced on March 8th, 1905, on the Josephine Wheelock Farm, so called, 25 feet from the Delancy Foster line and 280 feet north from the main road. It was supposed to be about 12 feet south from the crop of an iron ore vein.

The hole was finished on May 30th, 1905, the rate of boring was very much retarded and the cost increased on account of the railway blockade during the severe winter and spring.

Surface material	1.6	
Bluish slates, calcareous and with bands of calcite.	321.3	
Shaly hematite containing fossils and shells	8.10	
Red hematite	55.4	386.71

This hole was in ore when boring stopped.

The cost of the hole was made up as follows:

Labour	$ 705 00
Management	356 00
Fuel	400 00
Light, oil, waste, etc	20 00
Shot	62 00
Gravel	8 00
Material used in housing, etc	120 00
	$1671 24

Or $4.31 per foot.

Drill No. 2.

Caribou. This drill, in charge of Mr. Hayman, left the store-house at Westville, and commenced boring at Caribou, in January, 1905.

No. 1 Hole. The first hole was bored horizontally south from the face of the nine hundred-foot cross-cut from the seven hundred-foot level. The fastest rate of boring was five feet per hour, and an average rate of boring was accomplished of 1.75 feet per hour, twenty-three shifts being accomplished in the operation.

The percentage of core recovered was 17 per cent.

Boring commenced on January 13th, and finished on February 4th.

CABIBOU (NO. 1 HOLE).

NAME OF ROCK.	THICKNESS BORED.		TOTAL DEPTH FROM SURFACE.	
	Feet.	nche	Feet.	Inches.
Black slate	30	....	....	....
Black and grey slates	47	5	....	....
Grey slates	232	7	....	....
Black and grey slates mixed	92	....	402	....

Cost of Caribou bore-hole No. 1 :

Labour	$ 35	35
Management	100	00
Fuel	52	00
Light, oil, waste, etc	4	82
Carbon wear (at $60.00 per carat)	20	00
Other supplies	13	50
	$ 225	77

Which is equal to 56 cents per foot.

The carbon cost per foot was.

No. 2 HOLE. The drill was then moved to the 500 feet level west, and the hole was put in south (horizontally) at a point 554 feet from the shaft and opposite the north cross-cut.

Boring commenced on February 7th and finished on March 28th. A total of about 53 shifts work. The fastest rate of boring was 1.4 feet per hour.

Caribou (No. 2 Hole).

Name of Rock.	Thickness bored.		Total depth from surface.	
	Feet.	In.	Feet.	In.
Grey slate quartzite, showing calcite	46			
Quartz	...	2		
Grey slaty quartzite, showing calcite	4	...		
Black and grey slate	85	1		
Quartzite showing calcite	17	8		
Quartzite and slate	22	...		
Soft black slate	6	6		
Grey quartzite	4	...		
Quartz	...	2		
Black and grey slate	24	6		
Quartz	...	2		
Black and grey slate	46	4		
Slaty quartzite	4	...		
Black and grey slate	73	7		
Hard grey quartzite	4	3		
Black and grey slate	204	3		
Black slate and small bands of quartzite and stringers of quartz	46	7		
Black and grey slates	162	6	751	9

The cost of the hole was as follows :

Labour	$ 82	00
Management	280	71
Fuel	64	00
Light, oil, waste, etc	10	00
Carbons ($60.00 per carat)	45	00
Other expenses	6	22
	$ 488	33

Or 65 cents per foot.

The carbon cost per foot was 5.9 cents.

No. 3 Hole.

No. 3 hole was commenced on March 29th and finished on April 13th, 1905.

This was also a horizontal hole, and was bored north from the face of the cross-cut opposite No. 2 hole. The total depth was 381 feet 6 inches, and 26 shifts were employed. The fastest boring was 4 feet 4 inches per hour, and the average rate was 1.46 feet per hour. The percentage of core recovered was 50 per cent.

NAME OF ROCK.	THICKNESS BORED.		TOTAL DEPTH.	
	Feet,	Inches.	Feet.	Inches.
Grey slaty quartzite	189	3		
Grey quartzite	73	10		
" slaty quartzite	78	9		
" quartzite	39	8	381	6

The cost of this hole was made up as follows :

Labour	$ 35 25
Management	62 00
Fuel	44 00
Light, oil, waste, etc	6 20
Carbon wear	15 00
	$162 45

Or 42 cents per foot.

The carbon cost was 3.9 cents.

NO. 4 HOLE. This hole was put down from the surface at an angle of 45° north. The location was about 800 feet south of an ore-body opened on the surface.

The total depth was 200 feet and 13 shifts were occupied.

The fastest rate of boring was 4 feet 4 inches per hour, and the average rate was 1.5. Percentage of core recovered was 26%.

NAME OF ROCK.	Thickness bored.		Total depth.	
	Ft.	In.	Ft.	In.
Black and grey slate	59	4		
White quartz	2	6		
Black and grey slate	138	2	200	00

Cost of hole was :

Labour	$28 50
Management	19 00
Fuel	24 00
Oil, waste, etc	30
Carbon wear	16 25
	$88 05

Or 44 cents per foot.
Carbon cost 8.1 cents per foot.

No. 5 HOLE. Boring commenced May 6th and finished May 11th.

Location of this hole was west of hole No. 4 100 feet and 110 feet south of ore-body mentioned above.

Total depth 140 feet, fastest rate of boring 4 feet, 5 inches. Average rate of boring 1.75 feet per hour. Amount of core recovered was 22%.

NAME OF ROCK.	Thickness bored.		Total Depth.	
	Feet.	In.	Feet.	In.
Black and Grey Slates	74	4	....	......
Quartz	1	7	....	......
Black Slate	....	4	....	......
Quartz	1	8	....	......
Black and Grey Slate	17	1	....	......
Quartz	1	2	....	......
Black Slate	....	8	....	......
Quartz	....	5	....	......
Black and Grey Slate	42	9	140	......

Cost of hole was:

Labour	$23 25
Management	20 28
Fuel	12 00
Light, Oil, Waste, etc.	30
Carbon wear	20 00
Other expenses	10 00
	$85 83

Or 61 cents per foot.

Carbon cost 14.2 cents per foot.

No. 6 HOLE. Commenced boring on May 18th.

This hole was 100 feet west of hole No. 5 and 125 feet south of ore body. Fastest rate of boring was 5 feet per hour, and average rate was 2 feet per hour.

The hole was 200 feet deep, and percentage of core recovered was 25%. A record of the boring showed, alternate bands of black and grey slate.

Cost of hole.

Labour	$26 25
Management	20 28
Fuel	12 00
Light, oil, waste, etc	25
Carbon wear	7 00
Other expenses	10 00
	$75 78

Or 37 cents per foot.

Carbon cost was 3 cents per foot.

HOLE NO. 7. Commenced May, 1905, and finished May 27th, 1905. Situated 100 feet west of No. 6 hole, and 150 feet south of ore body. Was 232 feet deep. Fastest rate of boring was four feet ten inches per hour. Average rate was 1.93 per hour.

Percentage of core saved was 26.

NAME OF ROCK.	Thickness Bored.		Tota Depth.	
	Feet.	In.	Feet.	In.
Grey and black slates	132	3	....	......
Calcareous quartz	....	5	... .	......
Grey and black slates	99	4	232	......

COST OF HOLE.

Labour	$ 43 50
Management	25 20
Fuel	18 00
Light, oil, waste, etc	45
Carbon wear	44 00
	$131 15

Or 56 cents per foot.

Carbon cost was 18.9 cents per foot.

Debert.

NO. 6 HOLE. After completing the work at Caribou the drill was removed to the new storehouse at Hantsport, and late in June it was taken to Debert to bore for the Colchester Railway Company. The first hole was commenced at a point about 700 feet south-east of their mine on July 4th. The hole which reached an ultimate depth of 715 feet was finished on September 18th.

The average speed was 1.30 feet per hour, and the fastest rate of boring was 5 feet per hour. Core recovered.

Name of Rock.	Thickness bored.		Total Depth.	
	Feet.	In.	Feet.	In.
Surface gravel	20	6	......	......
Soft red sandstone	4	8	......	......
Grey and red sandstone	14	4	......	......
Soft red shale	50	4	......	......
Dark Grey shales	3	5	......	......
Black coaly shale	......	8	......	......
Soft red and dark grey shales	35	4	......	......
Soft red sandstone	9	11	......	......
Soft red shales	7	8	......	......
Soft red sandstone	9	2	......	......
Course grey sandstone	12	5	......	......
Soft red shale	6	2	......	......
Soft red sandstone	3	7	......	......
Coarse grey sandstone	4	11	......	......
Soft red sandstone	12	7	......	......
Red sandstone and shale	5	4	......	......
Grey sandstone	2	6	......	......
Alternate bands of red sandstone and red shale with one dark shale band at 485 feet.	311	3	......	......
Conglomeritic sandstone	3	......	......	......
Alternate bands of red sandstone and shale.	65	3	......	......
Conglomeritic sandstone and shale	8	3	......	......
Grey shale	......	5	......	......
Red and grey sandstone and shales	67	2	......	......
Grey sandstone with coaly streaks	16	0	......	......
Dark grey shale	11	2	......	......
Red sandstone and shales	22	11	......	......
Conglomerate	6	1	715	0

Cost of Hole.

Labour	$133 75
Management	234 52
Fuel	48 00
Light, oil, waste	4 20
Carbon wear	10 00
Material used in housing, etc	2 25

Casing pipe	6 00
Other expenses	22 56
	$ 46128

Or 64 cents per foot.
Carbon cost 1 4 cents per foot.

Hole No. 2. This whole was situated 400 feet south of the mine and was commenced on September 25th, and finished on October 2nd, 1905. It was bored on an angle of 65 degrees north. The total depth was only 58 feet. Average rate per hour 1 foot 1 inch, necessarily higher as it was so shallow.

Name of Rock.	Thickness bored.		Total depth.	
	Feet.	In.	Feet.	In.
Surface Material	26			
Red Shales and Sandstones	17	6		
Red Shales	13	11		
Grey Conglomeritic Sandstone		7		

Cost of hole:—

Labour	$18 80
Management	30 00
Fuel, Oil, etc	3 15
Freight, other expenses	6 50
	$58 45

Or $1.00 per foot (not including carbon wear.)

The drill was then moved to a point on west side of Debert River, 800 feet west of mine, where boring commenced on October 7th, in hole No. 3.

Drill No. 3.

Torbrook. The returns from this drill were very badly kept, and the information is meagre.

Hole No. 1. Boring commenced on February 16th, 1905, and the first bore-hole was put down on the Melbourne-Hoffman farm, about a quarter mile north of the road. The drill bored at forty-five degrees, thought to be at right angles to the vein.

Name of Rock.	Thickness Bored.		Total Depth.	
	Feet.	In.	Feet.	In.
Surface materials	18			
Greyish (fossiliferous) shales	20			
Greyish (fossiliferous) shales, showing calcite	4	6		
Mixed shales, hematite	2	5		
Red hematite	5	2		
Dark blue and grey slates	70	5		
Hematite and shales mixed	1	6		
Red hematite	1			
Dark shales	4	1		
Red hematite	6	2		
Grey shales	4	11		
Dark bluish shales	3			
Dark bluish shales, with bands of ore	11	7		
Light grey shales		9		
Red hematite	2	6		
Red and blue shales	10	4		
Red hematite	5	6		
Bluish shale, with calcite	2	10	174.8	

‡Cost of bore-hole:

Labour	$297 19
Management	199 60
Fuel	4 00
Light, oil, waste	11 80
Material and housing, etc	25 00
Other expenses	14 45
	$552 04

Or $3.13 per foot.

‡Does not include Carbon cost.

Two more holes were bored on the J. Goucher farm, but the records are so confused that they are not here given.

At 183 feet a vein of hematite 6 feet 5 inches was reported to have been bored through.

Drill No. 4.

Hole No. 1. The drill was moved here in August, and this hole was bored from a point on the 350 feet level and 127 feet west of slope.

Boring commenced on August 9th, and finished on September 7th. The angle of the hole was 45° north.

The average rate of boring was about 8 inches per hour, and the fastest rate was 20 inches per hour.

NAME OF ROCK.	Thickness bored.		Total depth.	
	Feet.	In.	Feet.	In.
Grey shale	6	6		
Sandstones	31	2		
Grey shale	10	9		
Sandstone	7	8		
Grey and dark shales	15	8		
Bright coal	4	6		
Shale	4	10		
Coal	0	2		
Sandstone and shales	21	0		
Coal with two small clay partings	2	6		
Shale and sandstone bands	12	2		
Soft grey shale	22	9		
Coal	3	0		
Soft grey shale	6	11		
Coal		3		
Shale	3			
Sandstone	19	9	168	7

The cost of the hole was :

Labour	$181 92
Management	60 00
Light, oil, waste, etc	25
Carbon cost	15 00
Other expenses	4 20
	$261 37

Or $1.52 per ton.

Carbon cost, —.

No more drilling was done with this machine during the financial year.

No. 5 Drill.

No. 5 drill was moved from Apple River in the winter of 1905 to the storehouse.

Drill No. 6.

Port Morien. Only one hole was put down here. It was located between the main and the fan shaft of the Gowrie and Blockhouse Collieries, near the shore of Cow Bay, and was put down to test the measures underlying the Gowrie Seam.

Name of Rock.	Thickness bored.		Total Depth.	
	Feet.	In.	Feet	In.
Gravel, boulders and clay	11	4		
Sandstone	18			
Shale	3			
Coal	2			
Shale	3	2		
Coal		6		
Grey sandstone	9			
Shales	2			
Grey sandstone, hard, nodules	2			
Shale	9			
Coal		8		
Sandstone	7	6		
Shale	6	6		
Sandstone	25	3		
Shale	23			
Sandstone	12			
Shale	9	8		
Conglomerate	3	4		
Sandstone	25			
Fossiliferous shale	5	4		
Sandstone	10			
Shale	2	6		
Sandstone	13	6		
Shale	1	2		
Coal, (Gowrie Seam)	5	6		
Fire Clay	9			
Sandstone	6			
Shale	21	6		
Sandstone	9	6		
Shale	16	11		
Sandstone	4			
Shale	4			
Sandstone	3			
Shale	1	2		
Sandstone	2	10		

Name of Rock.	Thickness bored.		Total Depth.	
	Feet.	In.	Feet.	In.
Shale	3			
Sandstone	10	2		
Shale		10		
Sandstone	2	2		
Shale	2			
Sandstone	3			
Shale	8			
Sandstone	4	6		
Shale	14	6		
Sandstone	16			
Shale	12	3		
Sandstone	17	3		
Shale	17			
Sandstone	11			
Shale	34	9		
Coal, with one shale band (Spencer Seam)	4	10¾		
Coaly shale	1	2½		
Shale	1	3		
Coal	1	9¼		
Sandstone	28	9¾		
Coal		7		
Shale	6	2		
Sandstone	9	6		
Shale	53			
Sandstone	15	9		
Shale	1			
Coal	2	8		
Shale	4	1		
Sandstone	2			
Shale	29	9		
Sandstone	9			
Shale	20	3		
Sandstone	3			
Shale	35			
Sandstone	4	6		
Shale with coal partings	4	6		
Shale	1	6		
Sandstone	4			
Shale	8	6	697	11¼

On account of long delays through accidents and a change in the drill runner, no record of the cost of this hole has been kept.

I remain,
Your obedient servant,
D'ARCY WEATHERBE, C. E.,
Deputy Inspector

PROVINCIAL MUSEUM
AND SCIENCE LIBRARY.

PROVINCIAL MUSEUM,
Halifax, N. S., 8th January, 1906.

To E. GILPIN, JR., ESQ., LL. D., C. I. S. O., ETC.,
Deputy Commissioner of Public Works and Mines.

SIR,—I respectfully present herein a report on the Provincial Museum of Nova Scotia and the Provincial Science Library, for the calendar year 1905.

PROVINCIAL MUSEUM.

During the year 722 specimens were catalogued, representing 210 accessions, all but two of them relating to the province. The following summary gives the number of additions that have been received during the past six years:

1900…………	1202	specimens	=	133	accessions.
1901…………	2660	"	=	546	"
1902…………	2039	"	=	816	"
1903…………	1911	"	=	744	"
1904…………	742	"	=	494	"
1905…………	722	"	=	210	"
Total, 6 years,	9276	"	=	2943	"

The decrease in the number of specimens received is the result of the more nearly complete state of the collections—the number of desiderata, as is to be expected, becoming less as time goes by.

Economic minerals at Provincial Exhibition.—The interest shown in the permanent collection of economic minerals of the province, collected and exhibited under the department's direction, at the Provincial Exhibition of 1903 and 1904, the need of more room for its proper display and expansion, the inconvenience of and damage resulting from packing and unpacking the specimens, and the impossibility of inducing companies to exhibit in temporary quarters, to which attention was drawn in last year's report, made it necessary that a special building be erected for the exhibit of minerals shown by the government and for such company exhibits as might be secured. In the summer of 1905, therefore, the Exhibition Commission erected a mines building, measuring 80 x 40 feet and well lighted by skylights and high-set windows. At the north end is an unpacking room with washing tank and a small office.

By your direction I went to Sydney and some other mining centres and interviewed companies and others, and secured promises to fill the space that was available for the purpose. In nearly every instance I met with ready compliance, particularly as the exhibit was to be a permanent one. The only criticism made was as to the smallness of the space at our disposal.

Early in September—in fact before the building was completed—we commenced to fit up the interior of the building for the exhibit, most of the old fittings, having been made as units, being utilized. The decorating and fitting-up was done at the expense of the department. The centre of the building was reserved for company exhibits, this space being 50 x 13 feet. This left a passage-way of about eight feet in width about the building.

The whole building was decorated inside with bunting and flags, and the walls were hung with trophies consisting of miners' tools of various kinds, loaned by Austen Bros. and H. H. Fuller & Co. of Halifax, and J. W. Cummings of New Glasgow. A large number of photographs connected with mining in the province were hung on the walls, together with geological maps, working plans and sections of mines, and tabular statements of gold yield, ore tonnage, and wages.

The Government's collection numbered about 230 or 240 samples, and occupied about 200 running feet of shelving and tables, and took up almost the entire wall space. Most of the specimens were displayed on step-shaped stands. The approximate number of samples shown in each group, such as coals, iron ores, etc., may be gathered from the enumeration given in last year's report.

The collection of gold-bearing quartz and nuggets was one of the best that has ever been brought together in the province, and naturally attracted much attention. It embraced very rich specimens, belonging to the department, from the Golden Group Mining Co.'s mine, at Montague, Halifax County, (two sets of samples); the Vermilon lead, at Gold River, Lunenburg County; South Uniacke, Halifax County; and Renfrew, Hants County; and there were also the following loaned specimens:—

Eight specimens, King or Ophir mine, North Brookfield, loaned by A. M. King, Annapolis, value…… ………$	2,603
Seven specimens, Borden lead, West Lake mine, Mount Uniacke, loaned by Messrs. Archibald and Crease, value………………………………………………	2,350
Sixty-two specimens, Annand or DeWolf lead, Montague, loaned by A. A. Hayward, Halifax, value……………	600
Thirteen specimens, Whin-bound lead, Mount Uniacke, loaned by J. A. Crease, value………………………………	500
Four specimens, Vermilion lead, Gold River, loaned by Capt. Hill, Halifax.	
Specimens, Nuggety lead, Mount Uniacke, loaned by J. A. Johnson, Halifax.	

Lower grade ore was also shown from a number of districts, with samples illustrating the cyanide and chlorination processes of gold extraction. An interesting exhibit was one by F. H. Mason, assayist and metallurgist, of Halifax, illustrating the various steps in the assay of a gold ore. Mr. Faribault's Goldenville sectional model was again shown, and, as usual, attracted attention, particularly from those interested in deep mining.

The company exhibits were:—

(1) Nova Scotia Steel & Coal Company, New Glasgow and Sydney Mines.—A very fine exhibit of iron and steel, raw materials and products, including an ingot of open-hearth basic steel, weighing 3,300 pounds, (analysis : phosphorus, ·0258 ; carbon, ·21 ; manganese, ·62 ; sulphur, ·038), a crank-shaft whose workmanship attracted the attention of all machinists, car axle, shafting, light rails, angle-iron, etc. A section of the "main seam" at Sydney Mines was also shown. This company's exhibit was very well displayed, and was one of the greatest attractions. (Space 20 x 6½ ft.)

(2) Dominion Iron and Steel Co., Sydney.—A small exhibit of raw materials and products which, however, was of special interest as including samples of the 80 pound steel rails, then just being produced at their new rail mill. (Space 15 x 3½ ft.)

(3) Londonderry Iron & Mining Co., Londonderry.—A fine display of provincial iron ores (limonite, hematite, etc.) from the company's mines at Londonderry and Torbrook. (Space 10 x 6½ ft.)

(4) Dominion Coal Co., Glace Bay.—A splendid section of the Phalen seam from roof to pavement, from Reserve Colliery. This weighed 2¼ tons. (Space 8 x 6½ ft.)

(5) Acadia Coal Co., Stellarton.—Various grades of coal from the company's collieries. (Space 6 x 6½ ft.)

(6) Cumberland Railway & Coal Co., Springhill.—Various grades of coal. (Space 6 x 6½ ft.)

(7) Port Hood Coal Co., Port Hood.—Various grades of coal· (Space 6 x 6½ ft.)

(8) Intercolonial Coal Mining Co., Westville.—Fire-bricks, fire-clay, and coal. The manufacture of the former is an industry recently started by the company, and the bricks, etc., of various patterns, were examined with much interest and favorably commented upon. (Space 8 x 6½ ft.)

(9) Dominion Tar and Chemical Co., Sydney.—An attractive exhibit of numerous by-products prepared from coal-tar obtained from the Dominion Steel Co. This is another new industry which promises much. (Space 5 x 4 ft.)

(10) Dominion Antimony Company, Halifax.—An excellent exhibit of auriferous stibnite and native antimony from the well-known mine at West Gore, Hants Co. (Space 5 x 6½ ft.)

(11) Sydney Cement Co., Sydney.—This company's exhibit of "Rampart Brand" Portland cement also attracted much attention, it being the first cement company to operate in the province, the works having been but recently established. The cement is made from granulated slag from the Dominion Steel Co.'s plant, with the addition of a small percentage of lime, the two ingredients being ground together in flint-lined cylindrical mills. The works at Sydney are well-equipped with improved grinding machinery, and the product has stood some good breaking tests. Besides the granulated slag and finished product, there were shown sewer sections and hollow building blocks made from the cement. (Space 5 x 6½ feet.)

(12) Colonial Copper Co., Cape D'Or.—Showed fine examples of native copper, with concentrates, bars and ingots, from its mine at Cape d'Or, Cumberland Co. (Space 3 x 6 feet.)

(13) Estate of Dr. McKay, J. J. Snook and A. H. Learment, Truro—Limonite (iron ore) from various openings on a deposit at Upper Kemptown, Colchester Co. a promising deposit now being prospected. (Space 3 x 6 ft.)

These exhibits occupied the entire central space of 50 x 13 feet, while there were also shown in other parts of the building samples of iron ore (magnetite and hematite) from Mira, C. B:, from A. G. Hamilton and others, of North Sydney; limonite from West Indian Road, Hants Co., from R. M. Holesworth, of Shubenacadie; hematite from Boisdale, C. B., from property of John Greener estate and Sheriff G. B. Ingraham; Baddeckite (a new variety of mica) in clay from Baddeck, from Charles L. Campbell, of North Sydney; clay from Leitche's Creek, C. B., from Peter McLean; coal from Gore, Hants Co., from William J. Murdoch; and manganese ore from W. Stephens, of Walton, Hants Co.

Among the mining tools loaned for decorative purposes were a number forged by J. W. Cummings of New Glasgow, N. S., consisting of coal-boring machines, augers, picks, mauls, wedges, copper needles, tamping bars, cones and swivels for wire rope, drawbars, etc. These tools, made in the province, elicited from coal miners very favorable comment for their superior workmanship, and seem worthy of special mention. Some of the tools were of Mr. Cummings' own design and had special features which commended them, the maker's experience as a practical miner making him familiar with the particular requirements of such tools and the ways in which improvements might be effected.

It may also be mentioned that among the tools loaned by the two other firms, were various patterns of miners' shovels, manufactured by the Halifax Shovel Co., the excellent quality of whose goods are, I believe, well recognized.

Special mention is made of these tools as having been made in the province.

The following medals, etc., were awarded to exhibits in the building, all in class 122 (mines and minerals) of the prize list:—

Gold Medal.

Sec. 5. Nova Scotia Steel & Coal Co., New Glasgow and Sydney Mines.—Iron ore, fluxes, pig iron and products.

Silver Medals.

Sec. 5. Dominion Iron & Steel Co., Sydney.—Iron ore, fluxes, pig iron and products.

Sec. 5. Londonderry Iron & Mining Co., Londonderry.—Iron ores.

Sec. 6. Colonial Copper Co., Cape D'Or.—Copper ores, matte, ingots, etc.

Sec. 7. A. M. King, Annapolis.—Gold ores.

Sec. 7. A. A. Hayward, Halifax.—Gold ores.

Sec. 8. Dominion Antimony Co., Halifax.—Antimony ore.

Sec. 9. Wm. Stephens, Walton.—Manganese ore.

Sec. 13. Intercolonial Coal Mining Co., Westville.—Refractory materials for furnaces, etc.

Sec. 14. Sydney Cement Co., Sydney.—Cement.

Sec. 16. Chas. L. Campbell, North Sydney,—New mineral, Baddeckite in clay.

Sec. 17. Dominion Tar and Chemical Co., Sydney.—By-products of coal.

Highly Commended.

Sec. —. Francis H. Mason, Halifax.--Samples illustrating the process of assaying a gold ore.

It was not found possible to define a basis upon which an award could be made in the section of coals, as the superiority of this mineral depends largely upon the use to which it is to be put—a coal which is excellent for one purpose being not suitable for another. It may be remarked that experience has shown that the prize-list as far as it relates to the class of mines and minerals is much in need of revision, and is at present unworkable in some particulars.

The exhibition opened on the 13th of September and closed on the 21st. I was in attendance during the time and gave such information regarding the specimens and mines as was asked for. Bound copies of the catalogue of the government exhibit were placed about for the use of visitors.

At the close of the exhibition the exhibits remained in their places, and were covered, so as to be ready for the Dominion Exhibition next year. Some general arrangements were also made for the management of next year's exhibition.

The fact that the building was practically filled the first year it was opened, leaving almost no room for future expansion which must take place, is probably proof that it is too small, and I have no doubt that had it been one-half as large again, it could have been easily filled even this year. As it was, some of the companies commented upon the small amount of space it was possible to allot them, and would have been willing to have filled more. The size of the building is probably the only regrettable feature connected with it. It was of excellent appearance without, with recessed portico and columns, and the terrace about it was sodded and decorated with palms kindly loaned by the Superintendent of the Public Gardens.

Minerals and rocks in Museum.—Since last report, the large collection of Nova Scotian rocks, with data, to the collection of which we have given a good deal of attention, has been arranged according to formations, in a set of 100 labelled drawers beneath the table-cases, 50 such drawers having been added to those already in use. Suites of rocks are now shown from all the geological formations of the province. The principal donations were a series of manganite specimens from the East River of Pictou iron mines, from F. H. Chambers, and a number of rock specimens, mostly from Shelburne, from T. V. Hill.

The rich specimens of auriferous quartz, belonging to the Mines Department, have been displayed in a strong steel-barred show-case which had been used for a similar purpose at the Paris exhibition. They include samples from Montague, Gold River, South Uniacke and Renfrew.

Fossils.—We have still to regret the absence of a typical set of fossils from the province, with the exception of those of the carboniferous formation. Specimens from the older formations are much desired.

Mammals.—Additions have been made to the collection of little-known small mammals, through the kindness of J. Perrin and F. H. Reid. We still require specimens of the sable or pine martin, pekan or fisher, beaver, otter, moose, and woodland caribou.

Birds.—The additions have chiefly been rarities, including the following: chuck-will's-widow (*A, carolinensis*), taken at Canso, 1st June, 1905; meadow lark (*S. magna*), taken at Eastern Passage, Halifax, 28th April, 1905; Blackburnian warbler, (*D. blackburniœ*), two specimens, taken at Summerville, Yarmouth Co., 4th June, 1904, and at Black River Lake, Kings Co., 20th May, 1905; mourning warbler (*G. philadelphia*), two specimens, taken at Carleton, Yarmouth Co., 6th June, 1904, and at Black River, King's Co., 11th June, 1905; and laughing gull (*L. atricilla*), from Eastern Passage, Halifax County, 23rd September, 1905. E. C. Allen, R. W. Tufts, F. H. Reid and others donated specimens in this department.

Further systematic observations on bird migration have been made for us by about the same observers as last year.

Batrachians.—A specimen of *Plethodon cinereus erythronotus* taken at McNab's Island, Halifax, 18th August, 1904, was presented by J. Perrin.

Insects.—A collection of injurious and beneficial insects, chiefly Lepidoptera, numbering three hundred and seventy-nine mounted specimens with data, the result of a number of years' collecting in the vicinity of Truro, N. S., by Miss Lucy C. Eaton, and containing some rare species, was purchased, but has not yet been displayed. This collection formed the basis of a paper by Miss Eaton, published in the *Proceedings and Transactions of the Nova Scotian Institute of Science*, vol. 9, p. xvi. J. Perrin is still collecting for the Museum in this department, but his specimens have not yet been received.

Accessions have been received in other departments, but not of sufficient importance to require special mention.

As usual, a good deal of the curator's time has been given to imparting information regarding our mines, minerals and other resources, and identifying specimens for prospectors and others; and a proportion of his time has also been given to matters connected with the public records of the province which are under his charge.

A list of donors is appended:

DONORS.

Acadia Coal Co., Stellarton; Allen (E. C.), Yarmouth; Allen (L. E.), Salem, Yarmouth Co.

Bell (Frank C.), Sydney; Bishop (Watson L.), Dartmouth; Bouteillier (James W. McL.), Sable Island; Brown (Richard H.)

Chambers (F. H.), Sydney; Crowell (John), Seal Island lighthouse.

Drummond (Hon. R.), Stellarton.

Geological and Natural History Survey, Ottawa.

Harlow (L. C.), Truro; Harrison (H. R.); Hill (T. V.); Holland (L. F. S.), Cow Bay, Halifax Co.

James (J. Owen), Truro.

Learment (A H.), Truro; Leigh (Rev. R. M.), Canso; Londonderry Iron and Mining Co., Londonderry.

MacCarthy (Hamilton), Ottawa; McFadyen (M.), Inverness; MacGillivray (Colin F.); MacKay (Dr. A. H.); Mason (F. H.); Millin (J. M.); Mines Department.

Nichols (Arthur L.), Berwick; Nickerson, (H. S.), West Port Clyde' Shelburne Co.

Perrin, (J.), MacNab's Island; Petipas (James), Portuguese Cove; Poole (Dr. H. S.); Hon. Provincial Secretary.

Randolph & Baker, Randolph, St. John, N. B.; Rosenburg (H. M.).

Standard Coal and Railway Co. (per R. H. Brown); Stephens (Robert), Londonderry; Stewart (J. M.), Pictou; Sydney Cement Co., Sydney.

Tufts (Harold F.), Wolfville; Tufts (Robie W.), Wolfville; Tully (T. W.).

Walker (A. J.), Truro.

SCIENCE LIBRARY.

The total number of books and pamphlets received by the library from all sources for the calendar year 1905 was 2,590. Of these, 1911 were received through the Nova Scotian Institute of Science; 93 were transfers from the Mines Department; 397 were non-society periodicals (mostly received through the Mines Department); 107 were transfers from the Legislative Library; 40 were purchases; 20 were from the Mining Society of Nova Scotia; 16 were parts of the *International Catalogue of Scientific Literature;* and 6 were donations. The 40 books received through purchase were mostly outstanding orders undelivered at the end of last year, no grant being available for purchases.

Besides the works consulted in the library, 536 books and pamphlets were borrowed. The following is a summary of books, etc., borrowed since the opening of the institution:

Year 1901, 158 books and pamphlets borrowed.
“ 1902, 163 “ “ “ “
“ 1903, 296 “ “ “ “
“ 1904, 519 “ “ “ “
“ 1905; 536 “ “ “ “

The number borrowed in 1905 would have been larger, but that many books, in other years borrowed by students of the School of Mines, were this year consulted in the library. The figures, it is gratifying to note, indicate a gradually increasing use of the library, and when it is considered that it possesses modern books that are invaluable to men employed in various industries in the province, a greater advertisement of the library and its resources would doubtless much increase its use. The publication of a catalogue, to be freely distributed if possible, would, I believe, be the most practical and useful way of bringing the library to the notice of our people.

The preparation of a thorough card-catalogue of the non-periodical part of the library was begun, by your direction, on the 24th of November last, and is now being worked upon. This has been for some time a very great need, or, rather, an absolute necessity, and will be of much assistance to readers, as well as a preliminary step towards the publication of a printed catalogue, when such is undertaken, which for the library and its users' sakes, should be soon. Books are being classed and arranged on the shelves by the "decimal system," but the cards will be arranged alphabetically by subjects, such arrangement, on consultation with technical users of the institution, being considered most advantageous.

A comparatively small number of volumes have been bound during the year. The necessity for a very much larger amount of binding is most urgently felt, particularly in a library like this, in which so many works are received in parts. I beg respectfully to draw your attention to this question of binding, which is one which I feel demands consideration.

During the past year the library received no grant for new books or running expenses, the annual grant of $500 which had been given in the past having been withdrawn, and unavoidable expenses had to be defrayed from the museum funds. Unless the grant is restored, I fear the ability of the library to assist practical studies and work in the province will be greatly hampered, and the work that had begun so well will be seriously interrupted. No class of literature more requires keeping up to date than that relating to technical subjects and the industries. The list of subjects given in last year's report as being covered by books purchased, will indicate the importance of the library to the many who are now employed in business connected with applied science. I feel, therefore, that I must most respectfully beg that the question of restoring the grant may have the consideration of the Government.

I have again to report that no transfer has yet been made of the scientific pamphlets in the Legislative Library, and therefore the transfer of works on those subjects from that institution to this one, as authorized some years ago, has not been completed.

Personal donations of books (apart from society and publishers' donations) were received from F. B. Crofton, Dr. E. Gilpin, jr., C. Ochiltree Macdonald, W. H. Prest and W. C. Milner.

The following list of non society periodicals received may be useful for reference:—

Canadian Mining Review (monthly), Ottawa.
Coal Trade Journal (weekly), New York.
Colliery Guardian (weekly), London.
Educational Review (monthly), St. John.
Engineering and Mining Journal (weekly), New York.
Engineering Review (monthly), London.
Industrial Advocate monthly) Halifax.

Maritime Mining Record (semi-monthly), Stellarton.
Mines and Minerals (monthly), Scranton, Pa.
Mining Journal (weekly), London.
Nature (weekly), London.
Science (weekly), New York.

I have the honor to be, Sir,

Your most obedient servant,

HARRY PIERS,

Curator and Librarian.

TABLES.

LIST OF MINERAL LEASES (OTHER THAN GOLD).

IRON.

No. of Lease.	Name of Owner.	County.	Name and Address of Agent of Company.
232, 257	Brookman, R. J., est. et al.	Cape Breton	
320	Archibald, C.	"	
296	Hamilton, A. G.	"	
310, 311	C. B. Coal, I. and Ry. Co.	"	McInnes, H., Halifax.
324, 282	Moseley, E. W.	"	
247	McNeil, Hector F., et al.	"	
191, 197	McVicar, John, est. of	"	
289	Greener, John, est. of, et al.	"	
292	Smith, Wiley	"	
258, 259, 260, 316, 261, 321, 385	MacPherson, M. A., Rev.	"	
372	Matheson, Alexander	"	
47, 48, 49, 50, 51, 52, 53, 54. 55, 56, 57, 58, 59, 87, 93/44	Bartlett, James H.	Pictou	
68, 71, 83, 70	N. S. Steel and Coal Co.	"	McColl, A., New Glasgow.
10	Fraser, R. P., et al.	Inverness	
137, 137, 139, 140	Cape Breton Coal and Iron Co.	"	McKay, D. L., South Lake Ainslie.
7	McDonald, Lauchlin	Antigonish	
8, 9, 10, 11	Cowlan, George B., et al.	"	
16A	Workingmen's Prospecting, Develop'g and Mg. Co., Ld	"	Keith, J. W., New Glasgow.
14, 17, 18, 19, 20	Wilkie, C. N.	"	

1, 2	N. S. Steel & Coal Co.	Guysborough.	
1	Smith, W. H., est., et al.	Hants.	
2	Woodworth, Amos, et al.	"	Woodworth, A., Milford, N. S.
12	Matheson, Joseph	Richmond	
7	Curry, Nathaniel, et al.	Colchester.	
	Copper, Lead, Etc.		
126	Matheson, Alex.	Cape Breton.	
286, 287, 70/95, 250, 372/106	Paine, A. C., Trustee	"	
181	Burchell, John E., et al.	"	
228	MacKenzie, John A., et al.	"	
277	Shares, J. O.	"	
116	Greener, J.	"	
407	Jennison, W. F.	"	
8, 11	Jenkins, T. K., est., et al.	Colchester	
5	Colonial Copper Co.	"	
2, 3	Franklyn, Geo. E., et al.	"	
145	Henderson, George	Inverness	
62, 102, 103	Cheticamp Copper Co.	"	
5, 16	MacKay, H. H.	Antigonish	
13	McDonald, A. K., et al.	"	
88	Holmes, S. H.	Pictou	
94	Pray, Henry C.	"	
3	Simpsom, H. O., et al.	Halifax.	
135A	McKenzie, Roderick	Cape Breton	
142	LeCras, Henry.	"	
145	McLean, John	"	

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—*(Continued.)*

COPPER, LEAD, ETC.

No. of Lease.	Name of Owner.	County.	Name and Address of Agent of Company.
89	Creelman, Wm., et al	Pictou	
9, 10	Carre, Frederick E., et al	Victoria	
14, 15	Carson, H. C.	“	
16	Gannon, John	“	
	COAL.		
83, 84, 85	Barton, A. McG., est	Pictou	
4/GMA, 3/1, 1/23, 2/42, 69, 95	Acadia Coal Co.	“	Coll, C. J., Stellarton.
5/12, 6/13, 7/14, 66, 96, 97, 98, 99	Intercolonial Coal Mg Co.	“	Fergie, C., Westville.
46, 8/6.	N. S. Steel and Coal Co.	“	McColl, A., New Glasgow.
10/24	Richey, M. H.	“	
11/11, 45, 9/10	Gray, B. G., est., et al	“	Gray, V. G., Montreal.
100	McKay, H. H.	“	
22/51, 104, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168	Canada Coals and Ry. Co.	Cumberland	
19/44. 16/6, 17/6, 18/8. 20/52, 21/55, 61A, 62, 71, 72, 73, 75, 76, 77, 80, 82, 83, 84, 89, 90, 108, 110, 111, 112, 114, 115, 117, 121, 122, 123, 124,	Cumberland Railway and Coal Company	Cumberland	Cowans, J. R., Springhill.

66, 67, 68, 69, 125A, 126, 128, 129, 135, 137, 138, 58, 59, 60, 142, 143, 144, 145, 146, 147, 149, 150, 151, 152, 153, 154, 155, 94, 169, 170, 171, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 196	Cumberland Railway and Coal Company	Cumberland	Cowans, J. R., Springhill.
202, 203, 204, 205, 206, 207, 208, 209, 210	Johnston, J. A., et al	Cumberland	
176	Gillis, Joseph A	"	
195, 8/5	Eastern Coal Co	"	
172	Stewart, C. J	"	
173	Weatherbe, U. J	"	
197, 198, 199, 200, 201	Maritime Coal and Railw'y Co.	"	Mitchell, D., Maccan.
131	Rogers, T. S., et al	"	
134	Givan, F. W., et al	"	
140, 141	Prospect Coal Mining Co	"	
9/22, 10/23, 11/28, 12/29, 13/30	Styles Mining Co	"	
23/53, 211, 212, 213	Strathcona Coal Co	"	
26/16	Minudie Coal Co	"	
86	Rutherford, John	"	
125	Francklyn, George E	"	
24/47, 25/9	Boston Coal Mining Co	"	
94A	Ripley, Enoch, et al	"	
42/52, 49/63	Montgomery-Moore, A.G., et al.	Cape Breton	
325, 326, 327, 328, 329, 330 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353,	N. S. Steel and Coal Co,	"	Brown, T. J., Sydney Mines.

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—(*Continued.*)

COAL.

No. of Lease.	Name of Owner.	County.	Name and Address of Agent of Company.
354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366 367, 368, 369, 370, 471, 13/79, 1/27, 2, 3, 28/GMA, 29/GMA, 30/GMA	N. S. Steel & Coal Co	Cape Breton	
173, 58/67, 298, 299, 300, 301, 303, 302, 304, 305, 306, 307, 378, 379, 380	Weatherbe, Robert L.	"	
111, 164	Sydney Coal Co	"	Hamilton, A. G., North Sydney.
45/5, 46/28, 47/29, 50/40, 51/41, 52/42, 60/54, 61/55, 62/56, 63/57, 64/58, 65/59, 66/60, 67/61, 68/62, 69/63, 108, 109, 110, 188, 207, 140, 252, 253, 254, 255, 256, 263, 265, 266, 267, 268, 269, 270, 271, 278, 279, 280, 162, 239, 240, 322, 323, 373, 374, 375, 376, 377, 386, 387, 388, 389, 390, 391, 392, 409, 410, 411	Dominion Coal Co	"	Duggan, G. A., Sydney.
290	McDonald, Alex	"	
117, 246	Hamilton, A. G.	"	
214, 220	Cayley, Hugh St. Q.	"	
179, 180, 190, 208, 223, 284.	Roberts, Frank	"	

130	Bennett, Samuel C.	Cape Breton	
128, 129, 219, 139	Moseley, E. T., est.	"	
203, 224	White, Alonzo J.	"	
141, 177, 213, 244, 112, 113, 114, 115, 118, 283	Cumberland Railway and Coal Co.	"	Cowans, J. R., Springhill.
146, 193, 194, 216, 235, 312, 313, 314, 315	Gowrie and Blockhouse Collieries, Ltd.	"	Burchell, Jas. T., Pt. Morien.
169, 170, 183, 297	McVey, James	"	
165	Stephens, L. H., et al.	"	
291	McCuish, D. A., et al.	"	
136, 138, 184, 199, 211, 236, 163, 185.	Atlantic Coal Co.	"	
408	Moseley, E. W.	"	
285	McGowan, John	"	
293, 294, 321	McPherson, Rev. M. A.	"	
210	Harold, T. C.	"	
196, 222, 237, 161, 178	Routledge, Thomas, et al.	"	
201, 221	Hickey, Cornelius	"	
131, 135, 144, 171, 174, 182, 212, 231, 233, 243, 308, 309, 317, 318, 319, 192, 215, 217, 226, 229, 234, 281, 295, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 186, 187, 202, 205, 206, 209, 200, 225	Cape Breton Coal, Iron and Railway Co.	"	McInnes, Hector, Halifax.
175	McDonald, Joseph	"	
167	Murray, John	"	
218	Morrison, Donald	"	
248	McMillan, John, et al.	"	
381	North Atlantic Collieries	"	

LIST OF MINERAL LEASES (OTHER THAN GOLD).—(*Continued.*)

COAL.

No. of Lease.	Name of Owner.	County.	Name and Address of Agent of Company.
382, 383, 384	Burchell, J. S.	Cape Breton	
1/2	C. B. Coal Mg. Co.	Victoria.	
7, 8	Dominion Coal Co	"	
11, 12	N. S. Steel & Coal Co.	Cape Breton	
1/13, 6/4, 7/10, 19, 20, 26, 29, 30, 111, 112, 113, 150	Port Hood Coal Co.	Inverness	
8, 9, 106, 107, 114, 115, 116, 117, 118, 119, 120, 121	Mabou Coal Mg. Co.	"	
11	Dawson, Geo., et al.	"	
15, 18, 24, 25, 28, 27, 40, 41, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 60, 61, 101, 104, 105, 127, 130, 3/11, 147, 149, 146, 148, 155, 157, 158, 159, 160, 161	Inverness Ry. & Coal Co., Ltd	"	
128, 129	National Trust Co.	"	
124	Gorham, J. W., et al.	"	
35, 38, 39	Ross, W., et al.	"	
142	Tobin, T. F.	"	
143, 144, 151, 152, 153	Dominion Coal Co.	"	
162	McMillan, L. B.	"	
43, 44	Farquhar, J. A., et al.	"	

32, 33, 34, 42	Wallace, C. M., et al	Inverness	
63, 64, 65, 96, 97, 98	Taylor, Ira	"	
66, 108, 109, 154	Lithgow, J. C., et al	"	
67, 68	McDonald, W. B	"	
69	McInnis, Hector, et al	"	
70, 71, 72, 77, 78, 79, 80	Roche, William, et al	"	
73, 74, 75, 76	Townsend, Silas, est	"	
81, 110	Caldwell, Thomas, et al	"	
82, 85, 88	Andrews, J. W	"	
89, 84, 83, 86, 37, 90, 91, 92, 93, 94, 95	Sherman, Chas. E	"	
34, 39, 40, 41, 42	Ross, Wm., et al	Richmond	
7	Terminal City Co.	"	
5, 36, 47, 48, 49, 50	N. Am. C. & D. C , Ltd	"	
20, 21, 22, 23, 28, 30, 46	Breton Coal Co	"	
35, 43	Dominion Coal Co	"	
11, 31, 33, 37	Richmond M. & T. Co	"	
45	Manley, A. J.	"	
6, 12	Jenkins, T. K., est	Colchester.	
10	Maple Leaf Prospecting Co.	"	
1	Ernst, J. E., et al	Lunenburg	

COAL SALES.

NAMES.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1905.
NOVA SCOTIA:					
By Land	185,047	302,898	290,280	315,739	1,093,964
By Sea	254,085	71,680	108,612	23,394	557,771
Total N. S.	439,132	374,578	398,892	439,133	1,651,735
New Brunswick	113,288	87,228	111,919	99,534	411,969
Newfoundland	51,322	17,730	26,567	42,501	138,120
P. E. Island	29,535	....	16, 77	29,424	75,136
Quebec	295,923	28,667	466,731	701,078	1,492,399
West Indies	....	....	....	2,524	2,524
United States	172,396	164,773	164,569	150,800	652,538
Other Countries	50,355	....	... .	508	50,863
Total	1,151,951	672,976	1,189,855	1,465,502	4,475,284

COAL.—GENERAL STATEMENT.

1905.	Production.	Sales.	Colliery Consumption.	
			Engines.	Workmen.
1st Quarter	1,265,473	1,151,951	92,324	21,752
2nd "	886,564	672,976	86,599	23,105
3rd "	1,383,795	1,184,855	89,372	13,896
4th "	1,514,588	1,465,502	87,248	12,550
Total	5,050,420	4,475,284	355,543	71,303

PRODUCTION AND SALES BY COLLIERIES.

YEAR ENDED SEPTEMBER 30TH, 1905.

COLLIERY.	PLACE.	PRODUCTION.	SALES.	COLLIERY CONSUMPTION.	
				Engines.	Workmen.
Maritime Coal Co.	Maccan, Cumberland Co.	38,667	32,949	3,687	1,383
Fundy Coal Co.	Lower Cove, “	2,227	1,493	417	97
Canada Coal and Railway Co.	Joggins, “	53,807	37,620	10,501	1,852
Minudie Coal Co.	River Hebert, “	32,376	29,981	1,377	967
Ripley & Blenkhorn	Maccan, “	2,755	2,240	245	140
Prospect Coal Co.	River Hebert, “	4,757	3,492	1,259	256
Strathcona Coal Co.	River Hebert, “	9,673	7,326	985	362
Cumberland Railway and Coal Co.	Springhill, “	477,254	412,109	44,240	13,265
Acadia Coal Co.	Westville, Pictou Co.	316,131	255,332	50,532	7,805
Intercolonial Coal Co.	Westville, “	230,943	197,897	19,062	5,185
Nova Scotia Steel and Coal Co.	Marsh, “	46,052	42,083	3,869	100
Dominion Coal Co.	Glace Bay, Cape Breton Co.	3,076,107	2,780,293	156,982	21,683
Gowrie and Blockhouse Collieries	Port Morien, “	39,981	32,182	7,339	978
Nova Scotia Steel and Coal Co.	Sydney Mines, “	501,126	484,194	26,423	11,871
Sydney Coal Co.	North Sydney, “	4,295	4,638	56	133
Cape Breton Coal Mining Co.	New Campbellton, Victoria Co.	4,033	3,375	545	430
Port Hood Coal Co.	Port Hood, Inverness Co	26,155	22,557	6,812	1,208
Mabou Coal Co.	Mabou Mines, “	5,233	975	3,441	381
Inverness Coal and Railway Co.	Broad Cove, “	175,848	124,548	17,771	3,207
Total		5,050,420	4,475,284	355,534	71 303

TABLE A.—COAL TRADE BY COUNTIES FOR THE YEAR ENDED SEPTEMBER 30TH, 1905.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter.........	178,957	150,601	161,721	139,122	848,409	807,652	76,386	54,576	1,265,473	1,151,951
2nd "	117,468	97,907	128,224	99,270	612,967	458,056	27,905	17,743	886,564	672,976
3rd "	168,706	144,048	155,891	125,867	1,009,333	878,400	49,865	36,540	1,383,795	1,184,855
4th "	156,385	134,654	147,290	131,053	1,153,800	1,157,199	57,113	42,596	1,514,588	1,465,502
Total,.........	621,516	527,210	593,126	495,312	3,624,509	3,301,307	211,269	151,455	5,050,420	4,475,284

TABLE B.—COAL TRADE BY COUNTIES.

	Cumberland.	Pictou.	Cape Breton.	Other Counties.	Total.
Nova Scotia—By land	146,352	304,462	610,914	32,236	1,093,964
By sea	1,226	15,465	497,475	43,605	557,771
Total N. S.	147,578	319,927	1,108,389	75,841	1,651,735
New Brunswick	244,017	34,841	111,940	21,171	411,969
Newfoundland	....	....	136,195	1,925	138,120
P. E. Island	....	25,276	39,217	10,643	75,136
Quebec	70,403	115,268	1,265,087	41,641	1,492,399
West Indies	....	....	2,524	....	2,524
United States	65,212	....	587,139	187	652,538
Other Countries	....	....	50,816	47	50,863
Total	527,210	495,312	3,301,307	151,455	4,475,284

Statement of Number and Classes of Persons Employed, etc., at each Mine during the Year ended Sept. 30th, 1905.

COMPANY.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTALS.		HORSES.		PIT WORKED.
	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Above.	Below.	Days.
Chigneeto	73	31	4	21,094	10	32	4	9,743	2	1	....	419	157	31,256	1	3	196
Joggins	100	70	19	37,829	9	76	9	19,960	......	....	....	....	283	57,789	6	8	230
Minudie	76	21	5	19,534	9	8	2	6,650	......	..	..	....	121	26,184	3	0	193
Prospect	41	14	11	6,332	5	9	1	2,005	......	....	...	....	81	8,337	1	....	120
Scotia	......	....	...	......	.....	....	....	....	....	....	....	....	......	.....	.	....	......
Springhill	607	515	136	281,552	145	338	51	117,831	......	....	.	......	1,792	399,383	26	55	224
Strathcona	.....	....	....	....	....	...	..	....	.....	...	....	....	.....	.....		....	....
Acadia	312	396	64	183,039	67	263	19	97,414	...	..	....	....	1,121	280,453	22	36	....
Intercolonial[1]	267	152	76	116,867	67	109	18	57,138	8	12	1	6,146	710	180,151	12	22	283
N. S. S. & Coal	38	37	11	18,754	10	8	..	5,310	....	....	....	....	104	24,064	1	....	236
Dominion Coal	1,494	1620	269	945,036	387	331	35	214,644	3	....	....	235	4,139	1,159,933	69	394	251
G & Blockhouse	34	31	4	20,700	11	26	6	12,900	11	22	2	10,500	147	44,100	4	12	300
N. S. S. & Coal	693	429	31	286,203	119	177	...	86.725	......	....	...	......	1,449	372,928	4	71	267
Sydney Coal	8	7	.	3,031	2	1	....	1,298	.....	....	....	......	18	4,329	1	.	205
Port Hood	22	23	5	16,267	13	19	2	9,807	...	...	...	.....	84	26,074	7	7	92
Mabou	15	6	..	5,324	15	8	...	6,227	1	..	....	78	45	11,629	1	....	179
Inverness Ry. & Coal	207	134	29	84,192	54	48	8	26,963	2	3	....	1,231	485	112,386	28	18	253
New Campbellton	15	7	3	2,575	5	10	4	1,957	...	....	....	.....	44	4,532	...	...	103
	4,002	3493	667	2,048,329	928	1463	159	676,572	27	38	3	18,627	10,780	2,743,528	186	626	

Expenditure of Coal Mines of Nova Scotia for Year ended September 30th, 1905.

	Shafts.	Slopes.	Levels.	Machinery.	Colliery Buildings.	Dwellings.	Wharves.	Prospecting.	Railways.	Miscellaneous.	Total.
Maritime Coal Co		$ 396	$ 3589	$ 527	$ 350				$ 101		$ 4963
Minudie Coal Co			837	250	1750			$ 630			3487
Prospect Coal Co		139	8002	1291	124					$500	10056
Strathcona Coal	$76368	2566	55	825		$ 140					3586
Acadia Coal Co	638			11998			$5946				94312
Intercolonial Coal Co			206	7246	19695		705		1213	226	29929
Nova Scotia Steel and Coal Co. (Marsh)			2554								2554
Gowrie and Block House Collieries		6783	7157	1913	31			1148	736		17768
Port Hood Coal Co		1530		862	984						3376
Mabou Coal Co		26362	25490	5654	9845	1723					69074
Inverness Coal and Railway Co		15799	16728								32527
New Campbellton		1758	762	256	75	100	50		145		3146
Total	$77006	$55333	$65400	$30822	$32854	$1963	$6701	$1778	$2195	$726	$274778

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

YEARS.	TONS.	DUTY.	YEARS.	TONS.	DUTY.
1850	118,173	24 ad.	1878	88,495	75
1851	116,274	"	1879	51,641	"
1852	87,542	"	1880	123,423	"
1853	120,764	"	1881	113,728	"
1854	139,125	Free.	1882	99,302	"
1855	103,222	"	1883	102,755	"
1856	126,152	"	1884	64,515	"
1857	123,335	"	1885	34,483	"
1858	186,743	"	1886	66,003	"
1859	122,720	"	1887	73,892	"
1860	149,289	"	1888	30,198	"
1861	204,457	"	1889	29,986	"
1862	192,612	"	1890	50,854	"
1863	282,775	"	1891	25,431	"
1864	347,594	"	1892	13,883	"
1865	465,194	"	1893	16,099	"
1866	404,252	"	*1894	79,837	40
1867	338,492	$1.25	†1895	73,097	"
1868	228,132	"	‡1896	174,919	"
1869	257,485	"	‖1897	106,279	67
1870	168,180	"	1898	98,027	"
1871	165,431	"	1899	153,188	"
1872	154,092	75	1900	624,273	"
1873	254,760	"	1901	590,086	"
1874	138,336	"	1902	751,382	"
1875	89,746	"	1903	968,832	"
1876	71,634	"	1904	652,538	"
1877	118,216	"			

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

* Nine months only.

† NOTE.—After August 1st, 1894, duty on Round Coal 40 cents, on Culm or Slack. 15 cents.

‡ Fiscal year begins October 1st, and ends September 30th. (Cap. 4, Acts 1893.)

‖ On July 24th. 1897, the duty was made 67 cents.

NOVA SCOTIA COAL SALES, 1785 TO 1904 (INCLUSIVE).

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668		1841	148,293	Forward, 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1899			1845	150,674	
1790		14,349	1846	146,506	
1791	2,670		1847	201,650	
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	1,533,798
1795	5,320		1851	153,499	
1706	5,249		1852	188,076	
1797	6,039		1853	217,416	
1798	5,948		1854	234,812	
1709	8,947		1855	238,215	
1800	8,401	51,048	1856	253,492	
1801	5,755		1857	294,198	
1802	7,769		1858	226,725	
1803	6,601		1859	270,293	
1804	5 976		1860	322,593	2,399,319
1805	10,130		1861	326,429	
1806	4,938		1862	395,637	
1807	5,119		1863	429,351	
1808	6,616		1864	576.935	
1809	8,919		1865	635,186	
1810	8,609	70,452	1866	553,520	
1811	8,516		1867	471,185	
1812	9,570		1868	453,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568.277	4,927,339
1815	9,326		1871	596,418	
1816	8,619		1872	785,914	
1817	6,284		1873	811,106	
1818	7.920		1874	749,127	
1819	8,692		1875	706,795	
1820	9.930	91,527	1876	634,209	
1821	11,308		1877	697,665	
1822	7,512		1878	693,511	
1823	27.000		1879	688,628	
1824			1880	954.659	7,317,430
1825			1881	1.035,014	
1826	12 600		1882	1,250,179	
1827	12.149		1883	1,297,523	
1828	20,967		1884	1,261.650	
1829	21,935		1885	1,254,510	
1830	27,269	140,820	1886	1,373,666	
1831	37,170		1887	1,519,684	
1832	50,369		1888	1,576.692	
1833	64,743		1889	1,755,107	
1834	50.813		1890	1 786,111	13,910,136
1835	56,434		1891	1,849,945	
1836	107,593		1892	1,752,934	
1837	118.942		*1893	1,485,914	
1838	106,730		†1894	2,019,742	
1839	145,962		1895	1,831,357	
1840	101,198	839,954	1896	2,047,133	
			1897	3,013.421	
			1898	2,135,397	
			1899	2,419,137	
			1900	2.997.546	20,552,526
			1901	3,119,335	
			1902	3,898,626	
			1903	4,621,074	
			1904	4.544,609	
			1905	4,475,284	
				Total........	20,658 948

SUMMARY.

1785 to 1790	14.349	1841 to 1850	1,533,798
1791 to 1800	51,048	1851 to 1860	2,399,319
1801 to 1810	70,452	1861 to 1870	4,927,339
1811 to 1820	91,527	1871 to 1880	7,317,439
1821 to 1830	140,820	1881 to 1890	13 910,136
1831 to 1840	839,954	1891 to 1900	20,552,526

*Nine months only. †Fiscal year begins Oct. 1st and ends Sept. 30th. (Chap. 4, Acts 1893.)

GOLD.

General Annual Statement.

Year	Material Crushed.	Toatl Gold Extracted.		
		Oz.	Dwt.	Grs.
1862	6473	7275	0	0
1863	17002	14001	14	17
1864	21434	20022	18	13
1865	24423	25454	4	8
1866	32162	25204	13	2
1867	31386	27314	11	11
1868	32262	20541	6	10
1869	35147	17868	0	19
1870	30829	19866	5	5
1871	30791	19227	7	4
1872	17093	13094	17	6
1873	17708	11852	7	19
1874	13844	9140	13	9
1875	14810	11208	14	19
1876	15490	12038	13	18
1877	17369	16882	6	1
1878	17990	12577	1	22
1879	15936	13801	8	10
1880	14037	13234	0	4
1881	15556	10756	13	2
1882	12081	14107	3	20
1883	25954	15446	9	23
1884	25147	16059	18	17
1885	28890	22202	12	20
1886	29010	23362	5	13
1887	22280	21211	17	18
1888	36178	22407	3	10
1889	39160	26155	6	13
1890	42749	24358	9	9
1891	35212	23391	0	0
1892	33633	21080	3	18
*1893	28040	14030	5	7
1894	39333	14980	7	13
1895	58082	22112	17	21
1896	65873	25596	14	6
1897	76559	26579	19	21
1898	86331	31104	17	0
1899	104122	27772	2	3
1900	65744	30399	14	14
1901	87992	30537	4	0
1902	192076	28279	5	13
1903	92645	25198	4	18
1904	62616	14279	18	14
1905	71725	15549	14	6
	1783174	857566	15	16

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* Nine months only.

PRODUCTION OF GOLD FROM 1862 TO 1905.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold per Ton.			Value. $19 Per Oz.
		Oz.	Dwt.	Gts.	Oz.	Dwt.	Grs.	
*Caribou and Moose River	179690	53423	17	3	....	5	23	1015053
Montague	28939	41864	15	23	1	8	22	795131
Oldham	52394	56139	1	3	1	1	10	1066642
Renfrew	52149	44991	7	19	....	17	6	854837
Sherbrooke	294846	152055	4	2	....	10	7	2889049
Stormont	305795	86334	11	6	....	5	15	1640356
Tangier	50542	23921	16	19	....	9	11	454515
†Uniacke	62971	43438	9	8	....	13	19	825331
Waverley	155520	69980	10	16	....	9	0	1329630
÷Brookfield	92754	38441	3	22	....	8	7	730383
‡Salmon River	118440	41699	10	20	....	7	1	792292
÷Whiteburn	6831	9757	14	2	1	8	14	185396
§Lake Catcha	26724	26351	17	3	1	19	17	500685
¶Rawdon	12189	9606	5	10	....	15	18	182519
Wine Harbour	70205	33561	16	11	....	9	13	637674
**Fifteen Mile Stream	36456	17058	15	5	....	9	8	324116
Malaga	20896	19293	11	7	....	18	11	366578
Other Districts	121908	66781	18	15	....	10	23	1268858
Total	1688649	834702	7	2		9	22	15859345

* From 1869. † From 1866. ‡ From 1883. ÷ From 1887. § From 1882. ¶ From 1887. ** 1883.

GENERAL GOLD STATEMENT.--*Year ended September 30th, 1905.*

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold per Ton.		
		.	Dwt.	Grs.	Oz.	Dwt.	Grs.
Stormont	28882	3316	6	16	....	2	7
Sherbrooke	4729	1053	1	20	....	4	1
Renfrew	512	36	5	....	....	1	10
Wine Harbour	2251	452	10	....	....	4	....
Leipsigate	5503	2239	8	....	....	8	3
Harrigan's Cove	65	15	....	....	....	4	15
North Brookfield	12657	4866	19	4	....	7	16
Waverley	....	2	4	15	....	....	....
Caribou	13998	1319	1	10	....	1	21
Oldham	1187	1401	9	18	1	3	15
Uniacke	38	99	11	15	2	12	10
Lake Catcha	56	64	18	15	1	3	5
Kemptville	120	87	16	....	....	14	15
Other Districts	1727	595	1	13	....	6	21
Total	71725	*15549	14	6	....	4	8

* This total does not include the Gold contained in the Stibnite Ore mined at West Gore, Hants Co. From joint assay made by buyer and seller, 527 tons and 519 pounds of mixed ore shipped during fiscal year contained 1232 ounces, 16 dwts., 23 grains of gold, valued at about $24,000. For the total production of ore, see Inspector's Report on Dominion Antimony Company contained elsewhere in the Annual Report. It should be stated that, at present, the operators do not receive more than half the value of the Gold contents of the ore.

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.

Month.	Stormont.					Sherbrooke.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	No	Crush	ing.	....	....	2	1155	121	4	0
November	1	2100	142	5	0	1	255	118	5	0
December	1	4854	360	5	0	3	755	172	6	20
January	2	3670	302	13	0	2	825	244	0	0
February	3	2092	280	13	12	2	1240	316	5	0
March	2	3800	254	11	12	1	290	71	5	0
April	3	1971	256	2	5	1	209	9	16	0
May	1	459	89	0	0	No	Crush	ing.		
June	3	3358	468	2	0		"			
July	2	619	217	15	11		"			
August	3	2555	496	10	0		"			
September	4	3104	448	9	0		"			
Total		28882	3316	6	16		4729		1	20

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—*Continued.*

MONTH.	RENFREW.					WINE HARBOUR.				
	No. of Mines.	Tons Crushed.	YIELD OF GOLD.			No. of Mines.	Tons Crushed.	YIELD OF GOLD.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October…	1	150	10	0	0	No	Crush	ing.		
November.	1	110	8	0	0	1	310	70	0	0
December	1	50	5	0	0	1	250	50	0	0
January	No	Crush	ing			1	375	92	0	0
February		"				No	Crush	ing.		
March		"					"			
April	1	47	3	15	0		"			
May	No	Crush	ing			1	606	154	0	0
June	1	21	2	10	0	1	620	71	0	0
July	1	62	2	5	0	1	90	15	10	0
August	1	1		15	0	No	Crush	ing.		
September	1	71	4	0	0		"			
Total		512	36	5	0		2251	452	10	0

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—*Continued.*

Month.	Leipsigate.					Harrigan Cove.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	1	430	179	10	0	No	Crushing.			
November	1	476	254	0	0		"			
December	1	520	263	9	0		"			
January	1	563	208	2	0		"			
February	1	296	166	3	0		"			
March	No	Crushing.					"			
April	1	719	330	14	0		"			
May	1	440	127	10	0	1	65	15	0	0
June	No	Crushing.				No	Crushing.			
July	1	630	207	0	0		"			
August	1	661	265	0	0		"			
September	1	768	238	0	0		"			
Total	....	*5503	2239	8	0	....	65	15	0	0

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* Mint returns show that the gold from the 5,503 tons above mentioned contained 402 oz., 9 dwt., 0 grs. silver.

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—*(Continued.)*

Month.	North Brookfield.					Waverley.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	2	965	310	10	19	No	Crush	ing.		
November	1	887	329	11	19		"			
December	1	1002	452	0	0		"			
January	1	843	319	0	0		"			
February	No	Crush	ing.				"			
March	1	946	343	0	0		"			
April	3	1496	651	3	14		"			
May	2	1287	439	3	0		"			
June	2	1545	484	15	0		"			
July	2	1097	384	11	0	Morta	red.	2	4	15
August	2	1208	411	4	0	No	Crush	ing.		
September	2	1381	742	0	0					
Total		12657	4866	19	4			2	4	15

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—(*Continued.*)

Month.	Caribou.					Oldham.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	5	2984	293	11	0	1	82	50	13	18
November	2	619	97	8	0	2	127	140	14	0
December	3	2235	108	10	10	2	166	192	3	0
January	2	1299	121	15	0	No	Crush	ing		
February	1	905	137	0	0		‘			
March	2	1182	128	12	0		“			
April	2	936	98	0	0	1	215	339	19	0
May	3	893	94	0	0	1	58	25	16	0
June	2	1199	90	8	0	2	114	168	3	0
July	2	1468	104	14	0	2	162	181	16	0
August	1	80	13	11	0	2	130	190	13	0
September	1	198	31	12	0	2	133	111	12	0
Total		13998	1319	1	10		1187	1401	9	18

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—(*Continued.*)

MONTH.	UNIACKE.					LAKE CATCHA.				
	No. of Mines.	Tons Crushed.	YIELD OF GOLD.			No. of Mines.	Tons Crushed	YIELD OF GOLD.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	No Crushing.						No Crushing.			
November		"						"		
December		"						"		
January		"						"		
February		"				2	43	42	8	15
March		"					No Crushing.			
April	2	18	18	1	15			"		
May	No Crushing.							"		
June		"						"		
July	Mortared.		20	15	0	2	11	8	16	0
August	No Crushing.					1	2	13	14	0
September	1	20	60	15	0		No Crushing.			
Total		38	99	11	15		56	64	18	15

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—(*Continued.*)

Month.	Kempville.					Other Districts.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October.	1	35	35	9	0	4	76	65	13	22
November	1	25	27	5	0	4	247	141	18	0
December	No	Crush	ing			1	12	4	19	13
January	1	20	7	9	0	2	222	148	16	2
February	No	Crush	ing			No	Crush	ing		
March		“				2	202	32	17	10
April.		“				1	111	13	14	15
May		“				3	287	49	6	5
June	1	40	17	13	0	2	160	22	19	18
July	No	Crush	ing			No	Crush	ing		
August						3	52	27	8	0
September						4	358	87	8	0
Total		120	87	16	0		1727	595	1	13

INTERCOLONIAL RAILWAY.

Statement showing the Number of Tons of Coal Received at the following Stations from Mines in Nova Scotia, during the Year ended September 30th, 1905.

Destination.	Tons.	Destination.	Tons.
Halifax	39418	*Brought forward...*	273776
Dartmouth	15879		
Waverley	183	Hawkesbury	19
Rockingham	37	West Bay Road	17
Tannery	40	Orangedale	66
Bedford	1200	Cleveland Siding	27
Windsor Junction	25253	Iona	639
Wellington	41	Grand Narrows	485
Enfield	341	Barrachois	20
Elmsdale	388	Christmas Island	32
Milford	6	Boisdale	50
Shubenacadie	245	Scotch Lake	199
Stewiacke	143	George's River	28
Brookfield	92	Young's Siding	43
Truro	19716	North Sydney	35
Valley	12	Sydney River	551
West River	63	Leitche's Creek	139
Glengarry	18	Point Edward	196
Hopewell	1723	Sydney	1874
Ferrona Junction	2386	Belmont	6
Stellarton	3746	Debert	6
Westville	60	East Mines	70
Sylvester	304	Londonderry	71833
New Glasgow	14026	Wentworth	7
Trenton	78384	Thomson	29
Pictou Landing	64930	Oxford Junction	22
West Merigomish	6	Oxford	1734
Merigomish	304	Pugwash	930
Avondale	107	Wallace Bridge	20
Antigonish	3863	Batty's Siding	21
Pomquet	12	Wallace	257
Heatherton	37	Malagash	75
Tracadie	19	Tatamagouche	583
Harbour au Bouche	98	Urquhart's	14
Mulgrave	604	Denmark	174
Point Tupper	92	Wilson's Siding	14
Carried forward...	273776	*Carried forward...*	353991

INTERCOLONIAL RAILWAY.—(*Continued.*)

Destination.	Tons.
Brought forward	353991
River John	686
Meadowville	105
Scotsburn	1599
Haliburton	20
Lyons' Brook	272
Pictou	15847
Athol	26
Maccan	7
Nappan	21
Amherst	37063
Aulac	149
Sackville	6886
Dorchester	1985
College Bridge	1081
Memramcook	199
Shediac	1391
Point du Chene	147
Moncton	20881
Salisbury	2029
Petitcodiac	584
Sussex	1196
Hampton	524
Rothesay	287
St. John	70779
Harcourt	19
Kent Junction	426
Rogersville	18
Chatham Junction	83
Loggieville	31
Chatham	8457
Doaktown	15
Boiestown	20
Gibson	132
Fredericton	2852
Millertown	182
Indiantown	55
Newcastle	431
Gloucester Junction	2073
Carried forward	532548
Brought forward	532548
Bathurst	218
New Mills	74
Dalhousie	144
Campbellton	647
Matapedia	2600
Amqvi	27
Ste. Flavie	52
Rimouski	109
Riviere du Loup	6191
Riviere Ouelle	1624
L'Islet	88
Montmagny	21
St. Henri Junction	30443
Chaudiere Junction	1012
Chaudiere Curve	573
Levis	1696
Villeroy	716
Beloeil	123
Montreal	3482
G. T. R. via Montreal	752
G. T. R. " Ste. Rosalie	206
G. T. R. " Chaudiere	150
G. T. R. " St. Lambert	49
C. P. R. " Ste. Rosalie	180
C. P. R. " St. John	3262
Total	586987

SUMMARY REPORT.

Stellarton	212296
Westville	22454
New Glasgow	52654
Albion	52017
Point Tupper	27781
North Sydney	21072
Sydney	5546
Springhill Junction	159059
Maccan	34108
Total	586987

INTERCOLONIAL RAILWAY.

Statement showing quantities of coal in tons received from the different mines in Nova Scotia for the use of the Intercolonial Railway, from the 1st of October, 1904, to the 30th September, 1905.

	Dominion Coal Co., Glace Bay, C. B.	N. S. Steel & Coal Co., New Glasgow N. S.	Inverness Railway and Coal Co., Inverness, N. S.	Port Hood Coal Co., Halifax, N. S.	Intercolonial Coal Mining Company, Westville, N. S.				Acadia Coal Company, Stellarton, N. S.				Cumberland Railway & Coal Co., Springhill, N. S.				
	Round.	Round.	Round.	Round.	Round.	Run of Mine.	Nut.	Slack.	Round.	Nut.	Slack.	Culm.	Round.	Run of Mine.	Nut.	Slack.	Culm.
1904.																	
October	6521	66¼	1943¼	.....	1106¼		....	....	8916¾	....	105¾	....	2449½	6218½	..	87	....
November	7293½	408	1624	1477	3098½	..	...		5773¼	..	76¼	..	4016½	6419½	....	.....	....
December	7081¼	289¾	2506½	1571¼	2345¼	...	30¾	....	7246¼	.	152¼	...	8570½	8541¾	...	21¾	..
1905.																	
January	8377¼	94	3613½	187¾	2615¾	13	....	20½	3718¼	..	131¼	....	5090¼	1199¼	...	.....	....
February	781¼	80½	327¾	.....	1383	106	18	...	2934¼	....	98	....	6359	45	....	....	.
March	7181¼	110¾	3767¾	.....	4313¼	...	.....	...	8676¼	....	360	....	11324½	2287¼	....	18	..
April	2480½	906¼	706¾	.....	5204¼	..	....	...	6061¼	....	140½	....	7953¼	738¼	....	55¼	....
May	1100¾	1776¾	......	.....	4171	...	....	....	5144	81	17	....	5028	285½	13¾	155⅝	....
June	975½	1543½	.....	.....	3093¾	....	....	45½	5825	84¾	38½	11	4905	28¾	...	159½	....
July	1653¾	1535½	.....	....	1096¼	....		....	5562	..	73½	...	4852	....	....	206	88
August	55858¾	2400¼	.. ..	....	2323¾	....	....	39¼	5725¾	32	19¼	....	9295	19½	....	......	183
September	5700¾	1511	....	....	5637	..	....	105	6226½	58½	60¼	....	4999	....	....	....	....
Total	55005½	10723	14489½	3236	36388	119	48¾	210¼	71809½	256¼	1272½	11	74842¾	25783¼	13¾	703½	271

	Maritime Coal & Railway Co., Chignecto, N. S.			Strathcona Coal Co., (Office) Moncton, N. B.			Minudie Coal Co., River Hebert, N. S.		Canada Coals and Railway Co., Joggins Mines, N. S.			Fundy Coal Co., Lower Cove, N. S.	R. Ripley & Co., Maccan, N. S.		Gowrie & Blockhouse, Port Morien, C. B.
	Round.	Run Mine.	Slack.	Round.	Run of Mine.	Slack.	Round.	Slack.	Round.	Run of Mine.	Slack.	Round.	Round.	Slack.	Round.
1904.															
October	2188	..	113½	240	......	193½	1049¼	125¼	2518	...	......	477	......	......	164
November	2598¼	36¼	72¼	721¼	.....	210	1793½	39¼	2484	17	.....	336¾	......	....	.
December	2965¾	....	156¼	408½	153	140	2364¾	251½	3505	....	....	413½	128	..	430
1905.															
January	477¼	....	20¾	365	......	21½	361	46¼	263	......	.....	196¼	103¼	.....	....
February	131	....	...	91	.....	.....	176½	.....	70	.....	..	179¾	252¾	....	...
March	1456½	....	93¾	542¼	327	......	1488¼	28½	2520	......	......	560	98	....	......
April	2725½	....	381½	1179½	271½	119½	2462½	210	3879	....	212	855¼	......	......	.....
May	2425	64½	296¾	987	532¾	80¾	1712¼	172	2769	....	67	636¾	153¾	......	...
June	2916¼	....	291	1375	271¼	152	2287¾	377¾	3831	.....	110½	531½	183¾	22	.....
July	1717½	....	189½	1798¾	......	244¾	2500½	16	3351	.....	..	....	65¼	31¾	.....
August	1877½	...	....	1517¾	.	180¾	2620¼	146	2703	....	134½	......	122¾	33	....
September	2240	....	30	1168	...	233	2267½	186	1783	...	168	...	178	......	.....
Total	23718½	100¾	1645¼	10394¾	1555½	1579¾	21084	1588¼	29676	17	692	4186¾	1285½	86¾	594

PRODUCTION OF GOLD FROM 1862 TO 1905.

DISTRICT.	TONS CRUSHED.	TOTAL YIELD OF GOLD.			AVERAGE YIELD OF GOLD PER TON.			VALUE. $19 PER OZ.
		OZ.	DWT.	GTS.	OZ.	DWT.	GRS.	
*Caribou and Moose River	179090	53423	17	3	....	5	23	1015053
Montague	28939	41864	15	23	1	8	22	795431
Oldham	52394	56139	1	3	1	1	10	1066642
Renfrew	52149	44991	7	19	....	17	6	854837
Sherbrooke	294846	152055	4	2	....	10	7	2889049
Stormont	305795	86334	11	6	....	5	15	1640356
Tangier	50542	23921	16	19	....	9	11	454515
†Uniacke	62971	43438	9	8	....	13	19	825331
Waverley	155520	69980	10	16	....	9	0	1329630
÷Brookfield	92754	38441	3	22	....	8	7	730383
‡Salmon River	118440	41699	10	20	....	7	1	792292
÷Whiteburn	6831	9757	14	2	1	8	14	185396
§Lake Catcha	26724	26351	17	3	1	19	17	500685
¶Rawdon	12189	9606	5	10	....	15	18	182519
Wine Harbour	70205	33561	16	11	....	9	13	637674
**Fifteen Mile Stream	36456	17058	15	5	....	9	8	324116
Malaga	20896	19293	11	7	....	18	11	366578
Other Districts	121908	66781	18	15	....	10	23	1268858
Total	1688649	834702	7	2		9	22	15859345

* From 1869. † From 1866. ‡ From 1883. ÷ From 1887. § From 1882. ¶ From 1887. ** 1883.

GENERAL GOLD STATEMENT.—*Year ended September 30th, 1905.*

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold per Ton.		
		.	Dwt.	Grs.	Oz.	Dwt.	Grs.
Stormont	28882	3316	6	16	....	2	7
Sherbrooke	4729	1053	1	20	....	4	1
Renfrew	512	36	5	....	....	1	10
Wine Harbour	2251	452	10	....	....	4	....
Leipsigate	5503	2239	8	....	....	8	3
Harrigan's Cove	65	15	....	....	....	4	15
North Brookfield	12657	4866	19	4	....	7	16
Waverley	....	2	4	15	....	....	....
Caribou	13998	1319	1	10	....	1	21
Oldham	1187	1401	9	18	1	3	15
Uniacke	38	99	11	15	2	12	10
Lake Catcha	56	64	18	15	1	3	5
Kemptville	120	87	16	....	....	14	15
Other Districts	1727	595	1	13	....	6	21
Total	71725	*15549	14	6	....	4	8

* This total does not include the Gold contained in the Stibnite Ore mined at West Gore, Hants Co. From joint assay made by buyer and seller, 527 tons and 519 pounds of mixed ore shipped during fiscal year contained 1232 ounces, 16 dwts., 23 grains of gold, valued at about $24,000. For the total production of ore, see Inspector's Report on Dominion Antimony Company contained elsewhere in the Annual Report. It should be stated that, at present, the operators do not receive more than half the value of the Gold contents of the ore.

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.

Month.	Stormont.					Sherbrooke.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	No	Crush	ing.	....	....	2	1155	121	4	0
November	1	2400	142	5	0	1	255	118	5	0
December	1	4854	360	5	0	3	755	172	6	20
January	2	3670	302	13	0	2	825	244	0	0
February	3	2092	280	13	12	2	1240	316	5	0
March	2	3800	254	11	12	1	290	71	5	0
April	3	1971	256	2	5	1	209	9	16	0
May	1	459	89	0	0	No	Crush	ing.		
June	3	3358	468	2	0		"			
July	2	619	217	15	11		"			
August	3	2555	496	10	0		"			
September	4	3104	448	9	0		"			
Total		28882	3316	6	16		4729		1	20

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—*Continued.*

MONTH.	RENFREW.					WINE HARBOUR.				
	No. of Mines.	Tons Crushed.	YIELD OF GOLD.			No. of Mines.	Tons Crushed.	YIELD OF GOLD.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	1	150	10	0	0	No	Crush	ing.		
November	1	110	8	0	0	1	310	70	0	0
December	1	50	5	0	0	1	250	50	0	0
January	No	Crush	ing			1	375	92	0	0
February		"				No	Crush	ing.		
March		"					"			
April	1	47	3	15	0		"			
May	No	Crush	ing			1	606	154	0	0
June	1	21	2	10	0	1	620	71	0	0
July	1	62	2	5	0	1	90	15	10	0
August	1	1		15	0	No	Crush	ing.		
September	1	71	4	0	0		"			
Total		512	36	5	0		2251	452	10	0

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—*Continued.*

Month.	Leipsigate.					Harrigan Cove.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	1	430	179	10	0	No	Crushing.			
November	1	476	254	0	0		"			
December	1	520	263	9	0		"			
January	1	563	208	2	0		"			
February	1	296	166	3	0		"			
March	No	Crushing.					"			
April	1	719	330	14	0		"			
May	1	440	127	10	0	1	65	15	0	0
June	No	Crushing.				No	Crushing.			
July	1	630	207	0	0		"			
August	1	661	265	0	0		"			
September	1	768	238	0	0		"			
Total	....	*5503	2239	8	0	....	65	15	0	0

* Mint returns show that the gold from the 5,503 tons above mentioned contained 402 oz., 9 dwt., 0 grs. silver.

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—*(Continued.)*

Month.	North Brookfield.					Waverley.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	2	965	310	10	19	No	Crush	ing.		
November	1	887	329	11	19		"			
December	1	1002	452	0	0		"			
January	1	843	319	0	0		"			
February	No	Crush	ing.				"			
March	1	946	343	0	0		"			
April	3	1496	651	3	14		"			
May	2	1287	439	3	0		"			
June	2	1545	484	15	0		"			
July	2	1097	384	11	0	Morta	red.	2	4	15
August	2	1208	411	4	0	No	Crush	ing.		
September	2	1381	742	0	0					
Total		12657	4866	19	4			2	4	15

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—(*Continued.*)

MONTH.	CARIBOU.					OLDHAM.				
	No. of Mines.	Tons Crushed.	YIELD OF GOLD.			No. of Mines.	Tons Crushed.	YIELD OF GOLD.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	5	2984	293	11	0	1	82	50	13	18
November	2	619	97	8	0	2	127	140	14	0
December	3	2235	108	10	10	2	166	192	3	0
January	2	1299	121	15	0	No	Crushing	ing		
February	1	905	137	0	0		"			
March	2	1182	128	12	0		"			
April	2	936	98	0	0	1	215	339	19	0
May	3	893	94	0	0	1	58	25	16	0
June	2	1199	90	8	0	2	114	168	3	0
July	2	1468	104	14	0	2	162	181	16	0
August	1	80	13	11	0	2	130	190	13	0
September	1	198	31	12	0	2	133	111	12	0
Total		13998	1319	1	10		1187	1401	9	18

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—(*Continued.*)

Month.	Uniacke.					Lake Catcha.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	No	Crush	ing.				No	Crush	ing.	
November		“						“		
December		“						“		
January		“						“		
February		“				2	43	42	8	15
March		“					No	Crush	ing.	
April	2	18	18	1	15			“		
May	No	Crush	ing.					“		
June		“						“		
July	Morta	red.	20	15	0	2	11	8	16	0
August	No	Crush	ing.			1	2	13	14	0
September	1	20	60	15	0		No	Crush	ing.	
Total		38	99	11	15		56	64	18	15

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—(*Continued.*)

Month.	Kempville.					Other Districts.				
	No. of Mines.	Tons Crushed.	Yield of Gold.			No. of Mines.	Tons Crushed.	Yield of Gold.		
			Oz.	Dwt.	Grs.			Oz.	Dwt.	Grs.
October	1	35	35	9	0	4	76	65	13	22
November	1	25	27	5	0	4	247	141	18	0
December	No	Crushing				1	12	4	19	13
January	1	20	7	9	0	2	222	148	16	2
February	No	Crushing				No	Crushing			
March		"				2	202	32	17	10
April		"				1	111	13	14	15
May		"				3	287	49	6	5
June	1	40	17	13	0	2	160	22	19	18
July	No	Crushing				No	Crushing			
August						3	52	27	8	0
September						4	358	87	8	0
Total		120	87	16	0		1727	595	1	13

INTERCOLONIAL RAILWAY.

Statement showing the Number of Tons of Coal Received at the following Stations from Mines in Nova Scotia, during the Year ended September 30th, 1905.

Destination.	Tons.	Destination.	Tons.
Halifax	39418	*Brought forward*	273776
Dartmouth	15879		
Waverley	183	Hawkesbury	19
Rockingham	37	West Bay Road	17
Tannery	40	Orangedale	66
Bedford	1200	Cleveland Siding	27
Windsor Junction	25253	Iona	639
Wellington	41	Grand Narrows	485
Enfield	341	Barrachois	20
Elmsdale	388	Christmas Island	32
Milford	6	Boisdale	50
Shubenacadie	245	Scotch Lake	199
Stewiacke	143	George's River	28
Brookfield	92	Young's Siding	43
Truro	19716	North Sydney	35
Valley	12	Sydney River	551
West River	63	Leitche's Creek	139
Glengarry	18	Point Edward	196
Hopewell	1723	Sydney	1874
Ferrona Junction	2386	Belmont	6
Stellarton	3746	Debert	6
Westville	60	East Mines	70
Sylvester	304	Londonderry	71833
New Glasgow	14026	Wentworth	7
Trenton	78384	Thomson	29
Pictou Landing	64930	Oxford Junction	22
West Merigomish	6	Oxford	1734
Merigomish	304	Pugwash	930
Avondale	107	Wallace Bridge	20
Antigonish	3863	Batty's Siding	21
Pomquet	12	Wallace	257
Heatherton	37	Malagash	75
Tracadie	19	Tatamagouche	583
Harbour au Bouche	98	Urquhart's	14
Mulgrave	604	Denmark	174
Point Tupper	92	Wilson's Siding	14
Carried forward	273776	*Carried forward*	353991

INTERCOLONIAL RAILWAY.—(*Continued.*)

Destination.	Tons.	Destination.	Tons.
Brought forward...	353991	*Brought forward...*	532548
River John...	686	Bathurst....	218
Meadowville	105	New Mills...............	74
Scotsburn.....	1599	Dalhousie...	144
Haliburton	20	Campbellton...	647
Lyons' Brook..	272	Matapedia..............	2600
Pictou.......	15847	Amqvi...	27
Athol....................	26	Ste. Flavie.............	52
Maccan........	7	Rimouski...............	109
Nappan..................	21	Riviere du Loup.......	6191
Amherst...	37063	Riviere Ouelle.........	1624
Aulac.......	149	L'Islet..................	88
Sackville............ ...	6886	Montmagny............	21
Dorchester	1985	St. Henri Junction.....	30443
College Bridge.........	1081	Chaudiere Junction...	1012
Memramcook	199	Chaudiere Curve......	573
Shediac......	1391	Levis....................	1696
Point du Chene.......	147	Villeroy.................	716
Moncton..	20881	Beloeil..................	123
Salisbury......	2029	Montreal.	3482
Petitcodiac....	584	G. T. R. via Montreal..	752
Sussex..................	1196	G. T. R. " Ste.Rosalie	206
Hampton...	524	G. T. R. " Chaudiere..	150
Rothesay...	287	G. T. R. " St.Lambert	49
St. John................	70779	C. P. R. " Ste.Rosalie	180
Harcourt	19	C. P. R. " St. John....	3262
Kent Junction.........	426		
Rogersville	18	Total...........	586987
Chatham Junction.....	83		
Loggieville....	31	SUMMARY REPORT.	
Chatham................	8457	Stellarton...............	212296
Doaktown.....	15	Westville	22454
Boiestown..............	20	New Glasgow...........	52654
Gibson......	132	Albion...................	52017
Fredericton	2852	Point Tupper.	27781
Millertown...	182	North Sydney..........	21072
Indiantown	55	Sydney	5546
Newcastle.........	431	Springhill Junction...	159059
Gloucester Junction...	2073	Maccan	34108
Carried forward...	532548	Total...........	586987

INTERCOLONIAL RAILWAY.

Statement showing quantities of coal in tons received from the different mines in Nova Scotia for the use of the Intercolonial Railway, from the 1st of October, 1904, to the 30th September, 1905.

	Dominion Coal Co., Glace Bay, C. B.	N. S. Steel & Coal Co., New Glasgow N. S.	Inverness Railway and Coal Co., Inverness, N. S.	Port Hood Coal Co., Halifax, N. S.	Intercolonial Coal Mining Company, Westville, N. S.				Acadia Coal Company, Stellarton, N. S.				Cumberland Railway & Coal Co., Springhill, N. S.				
	Round.	Round.	Round.	Round.	Round.	Run of Mine.	Nut.	Slack.	Round.	Nut.	Slack.	Culm.	Round.	Run of Mine.	Nut.	Slack.	Culm.
1904.																	
October	6521	66¼	1943¼	.....	1106¼		....	....	8916¾	....	105¾	....	2449½	6218½	..	87	....
November	7223½	408	1624	1477	3098½	..	...		5773¼	..	76¼	..	4016½	6419½	....	......	....
December	7081¼	289¾	2506½	1571¼	2345¼	..	30¾	....	7246¼	.	152¼	...	8570½	8541¾	...	21¾	..
1905.																	
January	8377¼	94	3613½	187¾	2615¾	13	....	20½	3718¼	..	131¼	....	5090¼	1199¼	...	.....	....
February	781¼	80½	327¾	....	1383	106	18	...	2934¼	....	98	....	6359	45	....	....	.
March	7181¼	110¾	3767¾	.....	4313¼	..	....	...	8676¼	....	360	....	11324½	2287¼	....	18	..
April	2480½	906¼	706¾	.....	5204¼	..	....	...	6061¼	....	140½	....	7953¼	738¼	....	55¼	....
May	1100¾	1776¾	......	.....	4171	...	....	....	5144	81	17	....	5028	285½	13¾	155⅜	....
June	975½	1543½	.....	.....	3093¾	....	....	45½	5825	84¾	38½	11	4905	28¾	...	159½	....
July	1653¾	1535½	.....	......	1096¼	....		....	5562	..	73½	...	4852	....	....	206	88
August	55858¾	2400¼	.. ..	....	2323¾	....	....	39¼	5725¾	32	19¼	....	9295	19½	....	......	183
September	5700¾	1511	....	....	5637	..	....	105	6226½	58½	60¼	....	4999	......	....	....	....
Total	55005½	10723	14489½	3236	36388	119	48¾	210¼	71809½	256¼	1272½	11	74842½	25783¼	13¾	703½	271

	Maritime Coal & Railway Co., Chignecto, N. S.			Strathcona Coal Co., (Office) Moncton, N. B.			Minudie Coal Co., River Hebert, N. S.		Canada Coals and Railway Co., Joggins Mines, N. S.			Fundy Coal Co., Lower Cove, N. S.	R. Ripley & Co., Maccan, N. S.		Gowrie & Blockhouse, Port Morien, C. B.
	Round.	Run Mine.	Slack.	Round.	Run of Mine.	Slack.	Round.	Slack.	Round.	Run of Mine.	Slack.	Round.	Round.	Slack.	Round.
1904.															
October	2188	. .	113½	240	......	193½	1049¼	125¼	2518	...	......	477	.....	.....	164
November	2598¼	36¼	72¼	721¼	.....	210	1793½	39¼	2484	17	.....	336¾	......	.....	.
December	2965¾	....	156¼	408½	153	140	2364¾	251½	3505	. ...	....	413½	128	....	430
1905.															
January	477¼	....	20¾	365	......	21½	361	46¼	263	......	. ....	196¼	103¼	.....	....
February	131	....	.. .	91	......	..... .	176½	.....	70	.....	..	179¾	252¾	. ...	...
March	1456½	....	93¾	542¼	327	......	1488¼	28½	2520	. ....	... ..	560	98	....	......
April	2725½	....	381½	1179½	271½	119½	2462½	210	3879	....	212	855¼	....	....	.....
May	2425	64½	296¾	987	532¾	80¾	1712¼	172	2769	.....	67	636¾	153¾	....	...
June	2916¼	....	291	1375	271¼	152	2287¾	377¾	3831	.....	110½	531½	183¾	22	.....
July	1717½	....	189½	1798¾	......	244¾	2500½	16	3351	.. ..	..	....	65¼	31¾	.....
August	1877½	...	....	1517¾	.	180¾	2620¼	146	2703	.. ..	134½	......	122¾	33	....
September	2240	....	30	1168	.. .	233	2267½	186	1783	...	168	...	178	....	.....
Total	23718½	100¾	1645¼	10394¾	1555½	1579¾	21084	1588¼	29676	17	692	4186¾	1285½	86¾	594